

**Editorial**

**Mobile Learning**

**Towards Curricular Validity in the Maelstrom of the Mobile Complex**

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**1 Aspects of socio-cultural transformation: how the mobile and social internet links to learning**

**1.1 Media convergence**

Within the steady stream of news about digital media two, albeit separate issues appear of particular relevance to us: one is the economic success of the social networking site Facebook and the other is the emergence of cloud computing and the attendant marginalisation of the personal computer. These are but indications of the types and the acceleration of the changes taking place in the digital world. Another issue, which is firmly located in the educational world, is the growing importance of international assessments and the ranking of schools according to results by PISA, the Programme for International Student Assessment (see e.g. <http://www.pisa.oecd.org/dataoecd/34/60/46619703.pdf>).

In our research we observe an important dynamic relating to the issue of Facebook and cloud computing which resides in what we call «the mobile complex» (see Pachler, Bachmair, Cook 2010, pp.3ff.). In the mobile complex, individual, local activities are intertwined with the internet and its services into a ubiquitous social sphere which comprises decision-making around consumption as well as the organisation of social interactions. The dominant device of the mobile complex is the smartphone, which operates at a local level, is constantly at the disposal of users and connects them with other users, information and services worldwide. Latest statistics show that the multifunctionality and convergence of smartphones are reaching normalisation: in 2010 the number of smartphone subscribers rose by a staggering 70% in the UK with an estimated 18 out of every 100 people now owning a handset with advanced computing ability (<http://www.signup-onlinemarketing.co.uk/knowledge/news/uk-smartphone-market-surges-2010/>). In everyday life, ubiquity and permanent availability connect with individuality in a public sphere. The mobile phone in everybody's hand is the visible dimension of

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the mobile complex. The more hidden part, and its driving force, is the economic dimension, which corresponds with a wide range of aspects of everyday life: communication, entertainment, commerce, knowledge generation, health care etc.

### **1.2 Learning inside and outside formal education**

Is there, then, also a correspondence with the second issue mentioned above, the international discussion about compulsory education and standards of attainment? For us, of course, this is a purely rhetorical question as formal education and the mobile complex just appear to belong to different worlds. Admittedly, they still belong to different institutional spheres: on the one hand, there is the new mixture of the flexible public internet sphere and its individual application in everyday life; on the other, there are formal learning environments characterised by traditional approaches to pedagogy and assessment. But even at the level of the visible surface of the mobile complex and learning we see links, in particular around a new habitus and informal modes of learning (see Kress and Pachler 2010). One increasingly prevalent manifestation of informal learning pervading everyday life across generational divides are mobile apps: one simple example is the primary school age child who plays the pre-installed games on dad's smartphone; discovering the world around the user, such as the local environment (cf. augmented reality) or planning bus or train journeys, are other examples. Apps for these purposes invariably involve a lot of learning.

## **2 Cultural resources and their recent transformation as common basis for media and learning**

We view mobile devices and attendant activities as cultural resources; cultural resources with growing significance for learning, including learning inside traditional contexts of formal environments as well as, of course, increasingly also for learning within new contexts. Changing practices of learning, we posit, require of educators to give particular consideration to mobile devices; this includes <didactic> and curricular planning.

Learning practices are in transition: PISA, for example, identified specific biases and disadvantages around learning in schools; importantly, the study inter alia highlighted was the trend of changes in the media landscape and media habits of everyday life placing considerable pressures on learning.

New mobile forms of learning can be observed to appear, particularly outside of formal educational settings. The mobile complex influences the cultural practices of media use and learning (see Pachler, Bachmair, Cook 2010, pp. 175ff.). A trend towards ubiquitous and individualised mobility fostered by mobile devices within the context of media convergence can be discerned. Furthermore, learning and a

lot of other forms of meaning-making take place in new contexts, which are partly determined by users and their capacity to generate them. This is a challenge for institutionalised planning of instruction and education.

### **3 The papers in this special issue and new cultural resources**

All papers in this special issue, which investigate the innovation of teaching and learning design through mobile devices, look for, and find ways of widening contexts. Approaches include platforms for mobile video (Unterfrauner or Wolf and Rummler) but also the traditional teaching and learning contexts of the classroom is opened up by Netbooks (Pimmer and Gröhbiel) or by several application on the pupils' mobile phones, e. g. geographical applications or photos for investigating the local environment (Bachmair et al.). One of the papers (Cushing) depicts how the disparate contexts within teacher training at college and in the classroom can be bridged with the help of mobile phones. Another paper (Taxler) outlines a conceptual frame for considering contexts as relevant for mobile learning and user-generated contexts. In his conclusion, Traxler «endorses the relationships between individual and environment as becoming increasingly richer and easier, as increasingly easy to exploit and deploy in support of existing, enhanced or reformed pedagogies, though recognising that we, not our surroundings, are now the focus and the source».

The question begs asking whether the influence of mobile devices within wider socio-cultural changes impacts on traditional institutionalised learning and, if so, how. The paper by Unterfrauner on marginalised young people in an urban context provides concrete answers. It also clearly shows that a specific didactic design is necessary that brings together mobile applications, e. g. the video, and a specific website, which receives its specificity by virtue of planned educational support within a special design, e. g. the video-ping-pong approach.

Papers in this issue give rise to the question whether banning mobile phones from school premises is the right approach to take. Is mobile learning a transient fashion or is it the future of technology-enhanced learning? Can and/or should it be assimilated into formal educational processes and practices – whereby the mobile phone becomes a cultural resource for learning – or should it remain confined to everyday life, informal settings and the work place? Is there any evidence to support the call for new and situated modes of learning in schools and other formal sites of learning by means of mobile devices within the context of media convergence? The papers of this special issue dealing with the practical application of mobile devices for learning and teaching provide a clear answer to this bundle of questions: a specific design for mobile learning is essential. It is not enough just to enrich existing instruction with a new motivating device. Mere enrichment of

existing instructional design does not lead to sustainability. The range of possible designs for mobile learning is wide.

New modes of assessment or mentoring at university level are also discussed as are episodes of situated learning within teacher-guided instruction (Bachmair et al.) and forms of enhancing learner-centred instruction (Pimmer and Gröhbriel). The designs of mobile learning investigated raise questions around the use of mobile devices within traditional contexts or for generating new contexts. Examples include combining instructional sites with websites (Unterfrauner; Wolf and Rummler) or using the mobile as «conversational bridge» between the classroom and at home. In the latter case the mobile changes traditional homework (Bachmair et al). Focusing on specific aspects of teaching and learning and on features of a mobile learning design the question of evaluation and its instruments has to be raised as a matter of urgency. The paper by Seipold and Pachler opens the debate on specific issues of evaluation of mobile learning.

#### **4 The ecological turn**

The mobile complex adheres to a logic that is difficult to discern at face value; a logic that is firmly rooted in market economic principles and utilitarianism. Commercial drivers are, therefore, strong in the world of mobile devices, applications and services. Similarly, we discern a strong influence of economic principles in educational discourse as evidenced, for example, by the increasing focus on international league tables which can be seen to be fundamentally based on the desire to maximise the exploitation of human resources economically and to ensure the economic relevance and workplace orientation of educational activities. This rationale is reflected in everyday life which has also become dominated by market forces.

We see it as our task to show that this economic orientation of the mobile complex as well as of education are not the only possibilities. The former, the mobile complex, we see facilitating a wide range of human activities, in particular self-representation, target-orientated endeavours and play. The latter, formal education we see as being fundamentally about broad and balanced opportunities for child development. This partial rejection of the economic imperative behind mobile learning and formal education we term the «ecological turn».

The educational task, therefore, is to define cultural resources from the human perspective of children and their personal and social development. Personal and social development for us is the crucial criterion for applying the learning options inherent in the mobile complex educationally. How can our premise of children's personal and social development best be concretised? There exists a real danger of the rhetoric around practices of cultural participation in a technologically augmented social world within the wider frame of the mobile complex defining

children's personal and social development as decorative marketing promotion of a happy childhood.

In view of this inherent danger, we propose and use the term user agency. By agency we mean the way in which children act and react to their pre-given world. Children's agency is changing. As second key term we use cultural practices through which children develop. School is such a cultural practice as is the use of media in everyday life. Viewing the mobile complex dialectically interwoven with children's agency and relevant cultural practices, the educational task is to identify those cultural resource which support children's personal and social development. This approach is based on an ecological interpretation of resources within a cultural frame (see Pachler, Bachmair, Cook, 2010, pp. 155 ff.). The practical educational endeavour is targeted on mobile resources in learning practices which support children's agency and meaning-making of the world.

This very condensed exposé of a socio-cultural ecology of mobile learning is based on the triangle model of socio-cultural development with the three nodes of societal and technological structures of the mobile complex, user agency and the cultural practices of media use and learning. This triangle model for considering mobile cultural resources represents core ideas of the London Mobile Learning Group (<http://www.londonmobilelearning.net>), of which the three editors of this special issue are founding members.

## **4 Issues discussed in the papers**

### **4.1 Cultural ecology**

Three of the articles in this special issue argue deliberately within the socio-cultural ecology of mobile learning: Bachmair, Risch, Friedrich and Mayer; Seipold and Pachler; and Wolf and Rummler. The paper by Bachmair, Risch, Friedrich, and Mayer depicts teaching and learning practices in regular German schools and comprises two instructional units, one from a German elementary school and one from a Gymnasium (grammar school). In the foreground of this paper stands the question of how to concretise the planning procedure for teachers. With a different theoretical frame Pimmer and Gröhbiel focus on the support of learner-centred tuition in pre-school and elementary school learning. They provided the classes with mobile notebooks.

The contribution by Seipold and Pachler applies the socio-cultural approach to mobile learning for analytical purposes and evaluates existing practices of mobile learning through this lens.

The paper by Wolf and Rummler primarily looks at the convergence side of the mobile complex. It shows how to set up a learning context by means of mobile video linked to an educational internet platform.

With a different theoretical frame but also with the intention of delivering a mobile context for learning, the paper by Unterfrauner shows how to support marginalized young people. Within an EU project an online mobile learning platform for mobile videos was installed.

#### **4.2 An epistemology of context**

Traxler's conceptual paper analyses the phenomenon of contexts in which or by which mobile devices, social activities and learning work. With the category of context the new modes of mobility within the mobile complex receive a central category. Normally the discussion of learning is on user-generated content. Content is a term with obvious links to learning. User-generated context, however, is not easy to detect as cultural resource for learning.

#### **4.3 Learning and instruction**

The papers by Cushing and Couldby and Davis consider the application of mobile phones for college/university-based learning and instruction. The latter examines the use of mobile technology for interprofessional, formative, work-based assessment among health and social care students. It was a project which ran over five years. Its special focus was on assessment. Cushing's report discusses how to apply mobile phones within teacher training. In teacher training students have to leave the university area and practice within schools. The main function of the mobile devices was to enhance the communication between the students and the university staff mentoring them.

### **5 Conclusions**

What can we conclude from the papers in this special issue? First, the papers demonstrate that mobile devices can meaningfully serve as interfaces between traditional and new contexts. And, second, specific designs for mobile learning and teaching seem essential in order to achieve sustainable results.

### **6 References**

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- Pachler, Norbert; Bachmair, Ben; Cook, John (2010). *Mobile Learning: Structures, Agency, Practices*. New York: Springer. Also available at: <http://www.springerlink.com/content/978-1-4419-0584-0>

## Eckpunkte einer Didaktik des mobilen Lernens Operationalisierung im Rahmen eines Schulversuchs

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### Überblick über den Beitrag

Der mobile, miniaturisierte Kommunikations- und Mediencomputer *Handy* ist eine im Alltag der Kinder und Jugendlichen selbstverständliche Kulturressource. Diese Kulturressource auch bewusst für Lernen in der Schule zu nutzen, war das Ziel des Schulversuchs *MyMobile - Handy im Unterricht*<sup>1</sup>. Die gemeinnützigen Medienpädagogik-Einrichtung *Medien+Bildung.com* der *Landeszentrale für Medien und Kommunikation (LMK)*, Rheinland-Pfalz, realisierte den Schulversuch 2010 in sechs Schulen in jeweils einer Klasse. Die jeweilige Fachlehrerin bzw. der Fachlehrer führte den Unterricht zusammen mit einer Medienpädagogin bzw. einem Medienpädagogen von *Medien+Bildung.com* durch. Der Handyeinsatz fand im Rahmen des lehrer/innengeleiteten Unterrichts des vorgegeben Lehrplan des Landes Rheinland-Pfalz statt. Der lehrer/innengeleitete Unterricht öffnete sich für *Episoden situierten Lernens* mit dem Handy. Dabei kamen sowohl Handys der Schüler und Schüler/innen als auch Handys zum Einsatz, die die Schüler/innen und Schüler zur Verfügung gestellt bekamen.

Der Beitrag stellt einleitend den theoretisch systematischen Rahmen für eine eigenständige Didaktik des *mobilen Lernens* vor. Ausgangspunkt ist das Handy als Produkt eines Mobilitätskomplexes, der im Alltag neue Kulturressourcen hat entstehen lassen. Der Gedanke der Kulturressource legt es nahe, das alltägliche Handy auch in der Schule curricular ernst zu nehmen und in vom Lehrplan legitimierte Lernprozesse einzubinden. Verantwortlich für die unterrichtspraktische Umsetzung sind *Eckpunkte des mobilen Lernens*. Diese *Eckpunkt* operationalisieren den theoretischen Ansatz, den die London Mobile Learning Group<sup>2</sup> als kulturökologischen Zugang zum mobilen Lernen vorgestellt hat (Pachler, Bachmair, Cook 2010). Anhand eines Beispiels aus der Grundschule zum Erstlesen und Erstschreiben und einer Mathematik-Unterrichtseinheit einer sechsten Klasse des Gymnasiums stellt der zweite Teil des Beitrags die sechs *Eckpunkt einer Didaktik des mobilen Lernens* vor. Der dritte Teil erörtert die technischen Nutzungsfunktionen des Handys mit Hilfe von sechs *Eckpunkten* zur multimedialen Funktionsvielfalt des Handys.

1 <http://www.medienundbildung.com/index.php?id=464>

2 <http://www.londonmobilelearning.net>

## 1 Mobiles Lernen ist mehr als nur eine didaktisch intelligente Handy-Nutzung

Wie immer in der Geschichte der Mediendidaktik entwickelt sich ausserhalb der Schule ein gesellschaftlich technologischer Komplex, in dem neue, d. h. für diesen Komplex spezifische Medien und deren Nutzungsformen entstehen. Das begann mit dem Lichtbild, dessen Einzug in die Schule schon in den 1920er-Jahren eine eigene Zeitschrift diskutierte. 1920 schrieb Gymnasiallehrer Dr. H. Mertel aus München im BILD-ARCHIV (1920, Nr. 1, S. 2-3):

Während, sich «das Wort des Lehrers» «wieder störend als sprechender Zeigestab» «zwischen Auge und Verstand» «drängt», hatte «unterdessen» ... die Fotografie und in ihrem Gefolge das Lichtbild seinen Siegeslauf angetreten; aber merkwürdig, die Schule stand gleichgültig bei Seite. ... alle Welt hielt Vorträge mit Lichtbildern, die Wissenschaft bediente sich der Lichtbildkunst so gut wie die Reklame, nur die Schule, zumal die höhere hielt diesem Neuen ihre Tore verschlossen. ... Genau so liegt die Sache beim Film: Gegenüber der Kinoseuche hat die Schule bislang nur Anklage und Verbote, das einzig wirksame Serum gegen diese Geistespest hat sie nicht in Anwendung gebracht, eben den Film. Doch auch hier scheint jetzt der Bann gebrochen.

Wie sich im ersten Satz des Zitates von Mertel lesen lässt, sah der Gymnasiallehrer eine wichtige didaktische Funktion für das Lichtbild, nämlich die eigene Anschauung eines Sachverhaltes zu ermöglichen. Statt nur der Lehrer/innenrede zu folgen, wären Schüler und Schüler/innen mit Hilfe des Lichtbildes in der Lage, sich per «Auge und Verstand» auf den Lerngegenstand zu konzentrieren. Ersetzt man im obigen Zitat «Kinoseuche» mit *Handy-Seuche*, dann könnte man/frau sich in Diskussionen in heutigen Lehrer/innenzimmern und auf Elternabenden erfolgreich einmischen.

Was lässt sich aus diesem nicht ganz zufälligen Beispiel als Muster destillieren? Das historische Beispiel ist deshalb nicht zufällig, weil es 1920 im Einleitungsheft einer neuen didaktischen Zeitschrift zu lesen war und damit zur Institutionalisierung der didaktischen Beschäftigung mit einem neuen, gesellschaftlich wichtigen Medium beitrug. Charakteristisch für dieses Muster ist zum einen der zwar vage, aber vorhandene Verweis auf einen gesellschaftlichen Komplex neuer Medien und zum anderen der schulinnovatorische Versuch, diese neuen Medien auch didaktisch zu nutzen. 1920 gehörten das Lichtbild in der Wissenschaft und die «Kinoseuche» zum damaligen gesellschaftlichen Medien-Komplex. Beim Hinweis auf das Lichtbild in der Wissenschaft handelt es sich, modern formuliert, um eine erfolgreiche Ressource im Wissenschaftsprozess, die sich auch als neues Hilfsmittel, also als didaktische Ressource, im Anschauungsunterricht einsetzen lässt. Hinter dem sim-



plen pädagogischen Bild von der «Kinosucht» verbirgt sich eine Ressource des Alltagslebens; Kino und Film als neue Ressource der Erzählung und der Unterhaltung. Das ist eine Ressource, mit der damalige Didaktiker/innen wenig anzufangen wussten. Verlängert man den Gedanken des gesellschaftlichen Medien- und Technologie-Komplexes und seiner Ressourcen an das Ende des 20. Jahrhunderts trifft man auf den PC- und Internet-Boom mit seinen technologischen wie ökonomischen Erscheinung, in den sich Didaktik und auch die Schulverwaltung erfolgreich eingebracht hat. Nicht nur die Wirtschaft, sondern auch Politik, Bildungsverwaltung und andere gesellschaftliche Gruppen sahen in PC und Internet Ressourcen der Modernisierung und in deren Nutzung eine Kulturtechnik, zu deren Erwerb die Schule beizutragen hatte. Die Bertelmann-Stiftung (1999) agierte hier z. B. als Innovationsagentur, die im Memorandum «Zukunft gewinnen – Bildung erneuern» von 1999 für eine neue Lernkultur eintrat. Das Memorandum nennt als eine von vier Leitlinien eines «Paradigmenwechsels in der Bildung» (S. 21): «Lernwelten erschliessen: neue Medien einsetzen» (S. 25 ff.).

Der Gedanke, Medieninnovationen der Gesellschaft als Kulturrressource in der Schule zu verwenden, ist für Pädagogik wie für die Institution der Schule ein Thema, das mit der Vorstellung von Entfremdung des Lernens, der Entfremdung von der direkten Erfahrung und der Entfremdung vom kulturell tradierten Leitmedium des Buches verbunden ist. Janette Böhme (2006) beschreibt diese Entfremdungs-vorstellungen mit dem Bild der «Schule als medienresistenter Polis» (S. 39), die am «bildungskulturellen Leitmedium» (S. 17) des Buches festhält. Die «medienresistente» Schule kann sich der Zustimmung der, wie es Jürgen Habermas (1990, S. 14ff.) nannte, «kulturräsonierenden Öffentlichkeit» sicher sein (vgl. Bachmair 2009, S. 19 ff.). Oder doch nicht? Die enorme Geschwindigkeit, mit der die Computer gebundene Informationstechnologie sich in der Schule im Sinne der obigen Leitlinie «Zukunft gewinnen – Bildung erneuern» durchsetzte, scheint dagegen zu sprechen. Wahrscheinlich hat sich die «medienresistente» Schule auf die Aufgabe der gesellschaftliche Innovation eingelassen und gesellschaftlich innovative Medien in der Sphäre der Schule akzeptiert. Für gesellschaftliche Innovation stand bis vor kurzem der Computer und steht heute die Medienkonvergenz mit dem Internet. Da bleiben Pädagogik und Schule nur noch die Abwehr von Unterhaltungsmedien und Unterhaltungsinhalten. Im Moment repräsentiert das Handy diese Unterhaltungsmedien und Unterhaltungsinhalte.

Hat die Schule mit ihrem Handy-Verbot nicht recht, um dem sachbezogenen Lernen wenigstens einen geschützten Raum zu belassen? Es zeichnet sich jedoch ab, dass das Handy unter dem Gesichtspunkt der gesellschaftliche Innovation auch für die Schule hoffähig wird. Stichwort ist hier die Medienkonvergenz mit dem Handy als ständig verfügbarer Schnittstelle zum Internet. Das Handy als sichtbares Instrument eines globalen Mobilitätskomplex und dessen Innovationspotential lässt es deshalb geraten erscheinen, pädagogisch nachzudenken, wie sich denn

das Handy als Kulturressource didaktisch nutzen lässt. Die im folgenden Beitrag vorgestellten *Eckpunkte des mobilen Lernens* sind als konkreter Beitrag zu solch einer pädagogischen Reflexion gedacht.

### 1.1 *Der Mobilitätskomplex in der Perspektive der Schule*

Der Internet-Komplex von vor 10 Jahren wandelte sich im Prozess der Individualisierung zu einem Mobilitätskomplex, bei denen Handy, Smartphones, Tablett-PCs oder sonstige mobile Technologie den ubiquitären, das heisst, den allgegenwärtigen und immerwährenden Zugang und Verfügbarkeit nicht nur zum Internet, sondern zum Medien- und Informationssystem gewährleistet. Die statische Beziehung PC / Internet / NutzerIn wandelt sich zu einer mobilen Beziehung. Mobile Beziehung heisst vor allem, eine individuelle Verfügbarkeit im konvergenten Medien- und Informationssystem des Internets mit von Nutzern/-innen generierten Kontexten (Dourish 2004) und Inhalten.

Wie sieht der Mobilitätskomplex in der Perspektive der Schule und der Schüler aus? Hierzu nur einige Stichpunkte. Die breite Diskussion findet sich bei Pachler, Bachmair, Cook (2010, S. 3 ff.). Der Mobilitätskomplex ist alles andere als nur eine technologische Angelegenheit. Technologie ist eingebunden in soziokulturelle Veränderungen wie die Ausdifferenzierung der Bevölkerung nach Lebensstilen und soziokulturellen Milieus. In unterschiedlichen Milieus aufzuwachsen führt zu unterschiedlichen Persönlichkeitsmustern und damit auch zu anderen Formen des Lernens und der Lebensgestaltung. In diesem Prozess der Ausdifferenzierung verliert die Schule ihre Definitionsmacht für das, was als Lernen angesehen und geschätzt wird. Informelles Lernen bekommt zunehmend mehr Bedeutung. Das Stichwort *Wissensgesellschaft* liefert die Brücke zwischen den neuen, im Moment noch informellen Lernformen und dem Mobilitätskomplex. Dazu gehört u. a. die *Inszenierung des Banalen*, wie Lothar Mikos (2004) eine der Strukturen der Wissensgesellschaft nennt. Dazu gehören auch neue und schulferne Formen des Lernens (Jörissen 2007, Tervooren 2007).

Wesentlich für den Mobilitätskomplex ist die Medienkonvergenz. Das ist das vernetzte und globale Medienangebot (siehe Kleinsteuber, Thomass 2004), mit vernetztem Zugang zu den Medien und einer Mediennutzung in Netzen (siehe Hasebrink u. a. 2004). Wenn man sich informelles, dennoch schulnahes Lernen in der Medienkonvergenz veranschaulichen will, dann genügt ein Blick in Hausaufgabenforen auf YouTube. Das Handy-Video, zum Beispiel, mit der Veranschaulichung des Pythagoras und mit den kommunikativen Folgeketten ist amüsant und zudem eindrucksvoll, ob der Ernsthaftigkeit der Beschäftigung mit Mathematik.<sup>3</sup>

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<sup>3</sup> <http://www.youtube.com/watch?v=hbhh-9edn3c&feature=related> 7. Dezember 2006 – Pythagoras' Theorem water-proved (made in Switzerland); aufgenommen am 16. Mai 10

Wie reagiert die Schule im Moment auf diesen Mobilitätskomplex, bei dem das Handy die Spitze des Eisberges ist? Im Moment steht bei den Schulen im Vordergrund, das Handy mit Verboten aus der Schule herauszuhalten und auf den kritischen, bewussten Umgang mit dem Handy hinzuwirken. Es sind die vertrauten Umgangsweisen mit Medien aus dem Unterhaltungsbereich. Was ist darüber hinaus denkbar? Das ist eine Frage an die Mediendidaktik, die in Deutschland eine Reihe theoretischer Zugängen entwickelt hat (siehe Tulodziecki, Herzig 2004, S. 109 ff, Kron, Sophos 2003, S. 53 ff., Sacher 2005, Kerres 2005, Diskussion weiter unten). Aus dieser mediendidaktischen Diskussion sind zwei Argumente wichtig (siehe Pachler, Bachmair, Cook 2010, S. 173 ff). Sie leiten auch den Modellversuch *My Mobile, Handy im Unterricht*:

- Informelles Lernen, die Kompetenz von Kindern und Jugendlichen im Mobilitätskomplex und neue habitualisierte Lernformen an die Schule heranzuführen und in den Unterricht einbinden. Es geht also um die didaktische Assimilation des Mobilitätskomplexes in die Schule.
- Wichtiges Mittel der didaktischen Assimilation ist, auf den Alltag der Schülerinnen und Schüler und ihre Entwicklung im Alltag einzugehen. Dieser Alltag ist mittlerweile mit dem Handy verbunden, ja sogar mit dem Handy verschmolzen. Wie lässt sich auf der Basis eines Assimilations-Modells auf die Schüler eingehen? Mit ihrem Handy und ihren Aktivitäten im Medienkonvergenzsystem bauen sie *Kommunikationsbrücken und Kommunikationsketten* vom Alltag in die Schule (siehe unten: *Eckpunkt 2.4*). Als Aufgabe kommt auf Lehrerinnen und Lehrer zu, solche *Kommunikationsbrücken und Kommunikationsketten* zu entdecken und an Lernsituation anzubinden. Weiterhin verlangt die Individualisierung von der Schule, bei ihren institutionalisierten Lehrprozessen auf die Entwicklung der Kinder einzugehen. Die Entwicklung der Kinder liefert den Rahmen für Lehren und Lernen (siehe unten: *Eckpunkt 2.6*)

Der Gedanke der kindlichen Entwicklung als Rahmen erfolgreichen Lehrens und Lernen leitet sich von Lev Vygotsky (1978 / 1930, S. 84ff, 1986/ 1934, S. 154 ff.) ab und seinem Konzept der «zones of proximal development». Der didaktische Gedanke der *Kommunikationsbrücken und Kommunikationsketten* basiert auf dem der «threads» im Internet; das sind Kommunikationsverläufe und Kommunikationsketten im Internet. Diana Laurillard (2007) liefert dazu das Modell. Sie sieht im Unterricht ein Gefüge von «conversational processes». Das Handy hat dabei die Aufgabe, die Kommunikationsprozesse des Alltagsleben mit denen der Schule zu verbinden. Abbild 1 bietet die Veranschaulichung von Diana Laurillards Modell der «conversational processes» (Interpretationsstrukturen des Unterrichts), in das zur Veranschaulichung das Bild eines Handy als Schnittstelle von Alltag und Schule eingefügt ist.

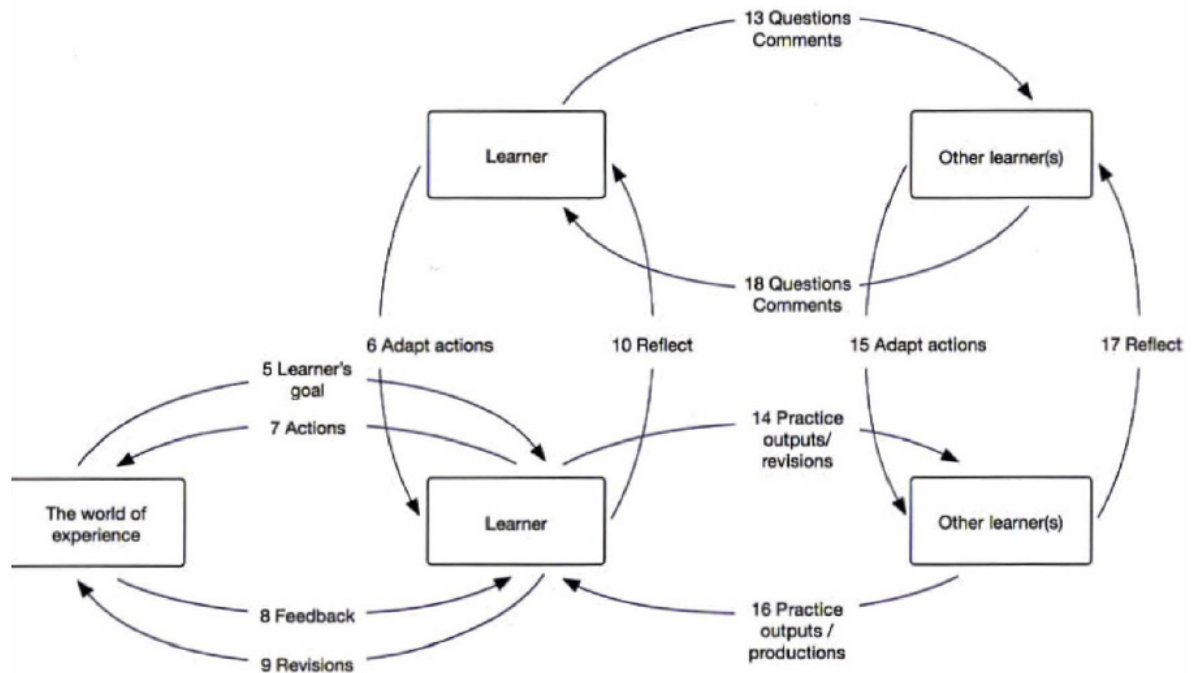


Abbildung 1: Interpretationsstrukturen des Unterrichts («conversational processes») nach Laurillard 2007, S. 171

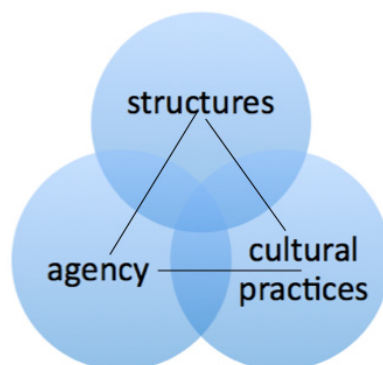
Dies Schema der Interpretationsstrukturen des Unterrichts von Diana Laurillard (2007; S. 171) zeigt die Öffnung der Schule, die mit dem Handy gelingen kann. Die Schule gewinnt im Sinne des «Conversational Framework» (Laurillard 2007) über die Schüler/innen («Learner») den Anschluss zu deren Erfahrungswelt («The world of experience»). Dazu gehören Unterrichts- und Alltagsstrategien wie Ziele zu setzen («Learner's goal»), zu handeln («Actions»), Rückmeldungen («Feedback») und Überprüfungen («Revision»). Hierbei können Handy-Funktionen (Mobilität, individuelle Verfügbarkeit, Foto, GPS, Anschlussfähigkeit zum PC) eine eigenständige und konstitutive Rolle übernehmen.

### 1.2 Handy, Kulturressourcen und Bildung: ein kulturökologischer Rahmen

In der bisherigen Argumentation spielte der Begriff der Kultur-Ressource, Medien als Ressourcen, eine tragende Rolle. In die Didaktik kam dieser vor allem ökonomische Begriff mit der Beschreibung der Industriegesellschaft, die sich im Prozess der Globalisierung zur *Wissensgesellschaft* entwickelt. In dieser Denklinie und in der Linie der gesellschaftlichen Entwicklung macht es Sinn, informelles und formelles Lernen, Kompetenzen, Literalität oder Medien als Kulturressourcen zu behandeln. Zu Ressourcen gibt es die bekannten Auseinandersetzungen um Zugänge, Verfügbarkeit und Macht, so auch beim Mobilitätskomplex. Ein aktuelles

Beispiel ist *Googles* Schritt *aus dem Internet in das Alltagsleben*, indem *Google* die Strassen und Häuser fotografiert. Damit gewinnt *Google* den Zugang zu den Handynutzer/innen, die, wo auch immer sie stehen oder gehen, per *App* die Informationen zu den umgebenden Konsumangeboten oder Kultureinrichtungen bekommen. Ebenso ermöglicht *Street View* den aktuellen Handy-Standort mit den in der Medienkonvergenz verfügbaren Informationen zu individuellen Profilen zu verknüpfen.

Warum diese Ressourcen des Mobilitätskomplexes *Google* überlassen und sie nicht für Teilhabe aller an Bildung ausschöpfen? Wie lässt sich jedoch diese schlichte Analogie von Ökonomie und Bildung auch pädagogisch begründen? Dazu kurz zwei Argumente, die an anderer Stelle ausführlich entwickelt wurden (siehe Bachmair 2009, S. 89 ff., 155 f.; Bachmair, Cook, Pachler 2009; Pachler, Bachmair, Cook 2010, S. 73 f, 155 ff.) Zum einen geht es um die Rolle von Kulturressourcen im Gefüge von Strukturen, Handlungs- und Persönlichkeitsformen sowie von Kulturpraktiken. Zu den Kulturpraktiken gehört u. a. die Mediennutzung im Alltag oder das formelle Lernen in der Schule. Im Moment versuchen Lehrer/innen, die Kulturpraxis der Schule aus den sich ändernden gesellschaftlichen Strukturen herauszuhalten. Dazu gehören die Verschiebungen, die mit dem Handy im Mobilitätskomplex einhergehen, wie z. B. mit von Nutzern/-innen generierte Kontexte. So ein nutzer/innengenerierter Kontext ist z. B. der Bereich der Hausaufgaben auf *YouTube*, in dem eine riesige Menge an kommentierten Handy-Videos steht. Die London Mobile Learning Group hat diese Gefüge von Strukturen, Handlungs- und Persönlichkeitsformen und Kompetenzen (*agency*) und kulturellen Praktiken mit Hilfe eines Dreieckmodells veranschaulicht.



**Abbildung 2:** Dreieckmodell zur Analyse der sozialkulturellen Entwicklung (Pachler, Bachmair, Cook 2010, S. 25)

Dieses Gefüge von gesellschaftlichen, sozial-kulturellen Strukturen, Handlungskompetenzen und Persönlichkeitsformen (*agency*) sowie von kulturellen Praktiken kann eine Gesellschaft dem Machtspiel oder dem Machtkampf der gesellschaftlichen Kräfte überlassen. Sie kann jedoch auch versuchen, diese Ressourcen so zu verteilen, dass alle drei Bereiche sich in ihrer Eigengesetzlichkeit aufeinander bezogen entwickeln. Mit dieser Aussage: *versuchen zu verteilen*, kommt eine Art handelndes Subjekt in die Diskussion. Das ist natürlich ein Optimismus, der so einfach nicht funktioniert. Als Pädagogin oder Pädagoge kann frau / man versuchen, sich mit intelligenten Vorschlägen wie einem Modelversuch in die Schulentwicklung einzumischen. Mit dem zweiten Gedanken, dem der Eigengesetzlichkeit, überträgt man / frau die Auseinandersetzung der 1970er und 1989 Jahre um Natur und Energie als Ressource auf den Bereich der Kultur. So gesehen lässt sich das Handy im Mobilitätskomplex z. B. mit neuen informellen Lernformen abwägend verbinden. Dazu gehört z. B. nach Unterrichtspraktiken zu suchen, wie das Handy als Alltagsressource von Risikolernern/-innen in der Hauptschule funktioniert.

Das Stichwort dazu heisst, das Handy als Ressource im Rahmen einer Kulturökologie in eine etablierte Schulpraxis einzufügen. *Einfügen in die Schulpraxis* entspricht dem oben formulierten Prinzip der Assimilation.

Das zweite Argument neben der Rolle von Kulturressourcen muss sich auf Bildung beziehen. Dieses *muss* in dieser Aufgabenstellung, ist nicht zufällig gewählt. Optimale Lernressourcen auszuwählen und sie in der Schule einzusetzen, ist allein noch nicht hinreichend und braucht eine pädagogische Legitimation. Dazu ist der Einsatz neuer oder alter Kulturressourcen von der Entwicklung der Kinder her zu begründen und zu rechtfertigen. In der Perspektive von Bildung entwickeln sich Kinder. Sie entfalten ihre Kräfte, so Bildung im Sinne von Wilhelm von Humboldt, indem sie sich die Kulturobjekte ihrer gesellschaftlichen Welt aneignen (vgl. Bachmair 2009, S. 157 ff., S. 227). *Aneignung* des Handys, *Aneignung* des Mobilitätskomplexes ist hierzu die Schlüsselkategorie, um auch Lernen in der Schule zu begründen (vgl. Pachler, Cook, Bachmair 2010). Mit dem Gedanken der Bildung kommt der pädagogische Auftrag in die Diskussion des Handys als Lernressource. Bildung basiert auf der Aneignung kultureller Güter, die die Grundlage der kindlichen Entwicklung ist. Im Humboldtschen Sinne ist Bildung eine mannigfaltige Ganzheit. Ebenso gehört dazu, dass die Kinder oder Jugendlichen mit ihren *Spuren* die Welt gestalten, sie Vernunft realisieren und dass sie all dies in Freiheit tun (siehe Bachmair 2009, S. 161 ff.).

Mit dieser mehr oder weniger explizit formulierten Bildungsausrichtung (z. B. Kerres 2005, S. 227) versucht heute Didaktik, die Schule für die Entwicklung der Kinder sowie für Gestaltung und die Ganzheit von Schule und dem Leben der Kinder zu öffnen. Wenn z. B. Werner Sacher (2005) für ein «arrangiertes Lernen» eintritt, wenn er «Lernarrangements» (S. 174), «Lernsituationen und Lernumgebungen» (S. 175) als didaktische Aufgabe an Lehrer/innen und Lehrer heranträgt, dann will er damit

«Verständigungsprozesse» (S. 179) ins «Aktgefüge des Lernens» u. a. mit «Erfahren, Erleben, Präsentieren, Anwenden und Üben, Integrieren, Festigen, Kontrollieren, Kommunizieren, Organisieren» (Modell S. 184) integrieren. All diese Prozesse sind auf die «Lebenspraxis als Bezugshorizont» ausgerichtet.

Die anglophone Diskussion stellt Lernen als Bedeutungskonstitution (*meaning-making*) heraus, die subjektzentriert in den Kontexten unterschiedlicher kultureller Praktiken stattfindet (z. B. Kress 2010). Natürlich ist nicht jede Form, mit den Kinder Sachverhalten, Ereignissen, Zeichen oder Medien Bedeutung zu verleihen und sich Bedeutung anzueignen, auch schon Lernen. Beim Lernen steht unter anderem im Vordergrund, Kenntnisse gezielt abzurufen und beabsichtigt zu verwenden. Bedeutung entsteht jedoch immer in Rahmen von Kontexten. Die Schule stellt hierzu einen standardisierten Kontext zu Verfügung. Es gibt aber viele Kontexte, in denen Kinder oder Jugendliche Wissen generiert, indem sie eigene Bedeutungen von Sachverhalten entwickeln. Dieser Zusammenhang von Bedeutung und Kontext fällt didaktisch gesehen unter das Stichwort des Situierten Lernens (Lave, Wenger 1991; Tulodziecki, Herzig 2004, S. 146 ff.), das heute auch als partizipatives Lernen angelegt ist (siehe Patten et al. 2006). Situiertes Lernen kommt nicht als irgend ein edles Ziel in die Didaktik, sondern weil es den Strukturen der heutigen Lebenswelt und dem Habitus von Risikolernen entspricht.

### **1.3 Das Papier «Eckpunkte einer Didaktik des mobilen Lernens»**

Wie lassen sich diese komplexen Überlegungen zur sozial-kulturellen Entwicklung und den daraus erwachsenden didaktischen Aufgaben in den Schulalltag umsetzen? Der Schulversuch *MyMobile – Handy im Unterricht* von Medien+Bildung.com in Rheinland-Pfalz hat 2009 und 2010 sechs Unterrichtseinheiten in Regelschule durchgeführt. Eine wesentlich Aufgabe war, den oben skizzierten Bezugsrahmen zu operationalisieren, was mit dem Papier «Eckpunkte einer Didaktik des mobilen Lernens» geschah (Text des Papiers siehe weiter unten). Der Entwicklung dieses *Eckpunkte*-Papiers ging in der *London Mobile Learning Group* die Diskussion von *Didactic parameters for analysing and planning within the mobile space of convergence and learning* (Pachler, Bachmair, Cook 2010, S. 297 ff.) voraus. Theoretisch systematisch gesehen, verbinden die *didaktischen Parameter* das schulische Lernen im Raum der Schule mit dem mobilen, individuellen und konvergenten Raum des Mobilitätskomplexes. Das Modell der Parameter beschreibt diesen mobilen, individuellen und konvergenten Raum im Verhältnis zur Schule:

Parameter 1: Lehr- und Lernform

Pol: Schulpraxis – Pol: Alltagsnutzung des Handys

Parameter 2: Verhältnis zum Lerngegenstand

Pol: mimetische Reproduktion - Pol: subjektive Rekonstruktion

Parameter 3: institutioneller Schwerpunkt des Lernens

Pol: Schulcurriculum - Pol: subjektive Kompetenz von Schülern als naive Experten

Parameter 4: Medien und Darstellungsformen

Pol: Isoliert, linear (mono-medial, mono-modal)- Pol: konvergent

Die Bewertung der Ergebnisse des Modellversuchs im abschliessenden 4. Teil basiert auf diesen didaktischen Parameter.

Die folgenden *Eckpunkte einer Didaktik des mobilen Lernens* bilden das operationale Bindeglied zwischen den Parametern eines mobilen, individuellen und konvergenten Raumes, in denen mobile Endgeräte vorhanden sind, und der curricularen Nutzung des Handys in der Schule. Wie ist das *Eckpunkte*-Papier aufgebaut? Es operationalisiert als erstes die Ziele des Handy-Einsatzes und gibt dafür eine knappe Begründung.

### **Eckpunkte einer Didaktik des mobilen Lernens<sup>4</sup>**

*Ziel des Handy-Einsatzes in der Schule ist, den Alltag der Kinder und Jugendlichen mit seiner typischen Medienkultur in die Lernformen der Schule zu integrieren. Dazu gehört auch die ausserhalb der Schule erworbene Kompetenz im Umgang mit den vernetzten digitalen Medien, die vom Computer bis zum Internet (Medienkonvergenz) reicht. Das Handy soll zudem den Lernerfolg in der Schule mit neuen Lernformen fördern. Neue Lernformen sollen auch Schüler/innen und Schüler mit Distanz zu Schule an den Lernerfolg der Schule heranführen.*

#### **1. Warum? Mobiles Lernen ist die didaktische Antwort auf die veränderte Medien- und Lernkultur vieler Kinder und Jugendlicher**

##### *1.1 Die neue dominante Medienkultur des Alltags: individualisiert, mobil und konvergent*

*Mobiles Lernen ist eine didaktische Antwort auf den aktuellen Individualisierungsschub mit der mobilen und vernetzten Massenkommunikation. Eine spezifische Didaktik mobilen Lernens reagiert auf den aktuellen soziokulturellen und technologischen Wandel, bei dem das alltägliche Handy den allgegenwärtigen und individuellen Zugang zu Kommunikation, Unterhaltung, Konsum, Internet, Medienangeboten oder auch zu Wissensarchiven liefert.*

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<sup>4</sup> Konzeption und Copyright der Eckpunkte einer Didaktik des mobilen Lernens einschliesslich der Didaktischen Eckpunkte und der Eckpunkte zu den Nutzungsfunktionen des Handys: Ben Bachmair www.ben-Bachmair.de 2010



*Mit dem Einsatz des Handys im Rahmen von Unterricht und curricularem Lernen trägt Schule der immer bedeutsamer werdenden Alltagsfunktion des Handys als Multimediagerät Rechnung. Wichtig sind auch die Funktionen des Handys als Zugangsmedium zum Web 2.0 und zu den verschiedenen sozialkulturellen Milieus.*

### *1.2 Zunehmende Bedeutung informellen Lernens und abnehmende Reichweite schulischen Lernens*

*Mobiles Lernen ist zudem eine didaktische Antwort auf die wachsende Bedeutung des informellen Lernens und des «Überall-Lernens» ausserhalb der Schule sowie auf die hohe Zahl bildungsferner Risikolerner in der Schule. Gerade für bildungsferne Schüler/innen und Schüler lässt sich mit dem Handy das informelle Lernen ihres Alltags in den Schulunterricht integrieren. Das Handy eröffnet Chancen für die Assimilation von informellem und formalem Lernen, indem es die vielfältigen Themen und unterschiedlichen Erlebnisweisen von Schüler/innen und Schülern einer fragmentierten Gesellschaft unterstützt. Ziel ist es, den schulischen Lernerfolg zu fördern.*

Den allgemeinen Zielen und der Begründung des Mobilien Lernens folgen zwei Listen mit konkreten Eckpunkten. Das ist die Liste der Eckpunkte zur Didaktik («2. Wie? Die Strukturmerkmale des mobilen Lernen») und die Liste der Eckpunkte zu den technischen Funktionen des Handys («3. Womit? Die multimediale Funktionsvielfalt des Handys als mobiler Mini-Computer und Schnittstelle der Medienkonvergenz»). Die Eckpunkte Didaktik und die Eckpunkte Handy-Anwendungen leiteten die Vorbereitung und die Diskussion der sechs Unterrichtseinheiten des Modellversuchs<sup>5</sup>. Die folgenden Teile 2 und 3 des Artikels geben einen kappen Überblick über die Anwendung der Eckpunkte in zwei dieser Unterrichtseinheiten:

#### ***Unterrichtseinheit «Konstruieren und Messen von Kreisen und Winkeln» im Mathematikunterricht eines 6. Schuljahres eines Gymnasiums***

Elisabeth Langgässer Gymnasium, Alzey

Zeitraumen: 4 Wochen, mit jeweils 4 Stunden

28 Schüler/innen, 12 Jahre alt

Klassenlehrer, Medienpädagogin, Praktikantin

Ausstattung: Klassenzimmer mit Tafel und interaktivem Whiteboard, Schul-PC, Internet, 10 Projekthandys Nokia N85, weitere Schülerhandys

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<sup>5</sup> Als einfache Form der Evaluierung der Unterrichtseinheiten gab es eine Schülerbefragung, die jedoch noch nicht abschliessend ausgewertet ist.

*Unterrichtseinheit «Buchstaben und Laute erkennen, bestimmen und lokalisieren» im Erstlese- und Schreibunterricht im 1. Schuljahr einer Grundschule.*

Grundschule Luitpoldschule, Ludwigshafen

Zeitraumen: 5 Wochen, insgesamt 9 Doppelstunden

26 Schüler/innen, 6-7 Jahre alt

Klassenlehrerin, Medienpädagogin, Praktikantin

Ausstattung: Klassenzimmer mit Tafel, 2 Schul-PCs, Beamer, 19 Projekthandys Nokia N85

## **2 Die didaktischen Strukturmerkmale des mobilen Lernens – sechs Eckpunkte für die Planung und Analyse des Unterrichts mit dem Handy**

Die obige Einleitung des *Eckpunkte*-Papiers orientiert sich an den aktuellen soziokulturellen Veränderungen, die nicht nur zu neuen medialen Formen, sondern auch zu neuen Lernformen ausserhalb der Schule führen. Deshalb deckt der erste didaktische Eckpunkt das informelle Lernen ab. Informelles Lernen ist zwar hoch relevant für den ausserschulischen Bereich, trifft jedoch in der Schulpraxis eher auf einen blinden Fleck. Obwohl die Entwicklung hin zum informellen Lernen bewusst beim Schulversuch *MyMobile – Handy im Unterricht* bedacht wurde, so war es doch schwer, informelles Lernen in der vertrauten Schulpraxis zu entdecken oder gar zu ermöglichen. Erfolgreich war hingegen die für die Unterrichtsplanung leitende Idee, Episoden *situierter Lernens* mit Hilfe des Handys in den lehrer/innengeleiteten Unterricht einzufügen. Beim *situierter Lernens* bietet die Lehrerin oder der Lehrer Situation an, in denen Schüler/innen sich mit Themen auseinandersetzen, in denen sie Wissen selber entwickeln oder selber abrufen. In den revidierten *Didaktischen Eckpunkten des mobilen Lernens* wird deshalb auch das Schlüsselement des didaktischen Designs (Brown 1992), das ist das *situierter Lernens*, am Anfang stehen. In der Unterrichtseinheit der Grundschule im Erstlese- und Schreibunterricht der 1. Klasse gibt es *situierter Lernens* in der Form von Lern-Stationen. In den Lern-Stationen kneten die Kinder Buchstaben mit Plastilin, schreiben sie in Sand oder suchen und fotografieren Wörter mit dem Handy, in denen der aktuelle Buchstabe enthalten ist. Im Mathematikunterricht der 6. Klasse fotografieren die Schüler/innen z. B. zu Hause und als Hausaufgabe Winkel, die sie in ihrer Wohnung oder in ihrer Umgebung finden.

Die Beispiele für die folgende Erläuterung der sechs didaktischen *Eckpunkte* stammen aus zwei der sechs Unterrichtseinheiten des Schulversuchs *MyMobile – Handy im Unterricht*, und zwar aus dem Erstlese- und Erstschriftunterricht der Grundschule Luitpoldschule in Ludwigshafen und aus dem Mathematikunterricht des Elisabeth-Langgässer-Gymnasiums in Alzey.

### **Didaktischer Eckpunkt 2.1: Mit dem Handy informelles Lernen in die Schule integrieren**

Das Alltagsmedium Handy bietet die Möglichkeit, informelles Lernen und Wissen des Alltags in die Schule einzubinden. Es kann als Schnittstelle zwischen der Kinder- bzw. Jugendkultur, dem Alltagsleben und dem gezielten Lernen im Unterricht funktionieren.

#### **Fotosafari im Erstlese- und Schreibunterricht**

Ein Beispiel dazu ist die *Foto-Safari* mit dem Handy, bei der sich die Kinder in der Schule aber auch zu Hause auf *Entdeckungsreise nach den Elefantenwörtern* (zusammengesetzte Nomenwörter) begeben (vgl. auch Teil 3, Eckpunkt 3.4). Das passt zum Lehrplan Deutsch, der vorschreibt, dass Kinder über Sprache nachdenken und in diesem Zusammenhang Begriffe klären, Wortbedeutungen erschliessen sowie Regelmäßigkeit erkennen sollen (Rahmenplan Grundschule, Teilrahmenplan Deutsch Rheinland-Pfalz, 2005, Seite 11). Mehrere Kinder präsentieren ihre mitgebrachten Fotos im Gesprächskreis. Gemeinsam überlegen die Kinder, wie viele und welche Wörter sich in den grossen Elefantenwörtern verstecken, z. B. Osterhase, Aufgabenheft, Abfallwirtschaftsgesellschaft, Müllheizkraftwerk, Schulranzen.



Abbildung 3: Präsentation der Hausaufgabe in der Grundschule

Ein Junge präsentiert stolz seine mitgebrachten Fotos, die aus mehreren Wörtern bestehen: Müllheizkraftwerk, Abfallwirtschaftsgesellschaft. Er erzählt, dass er die Wörter bei einem Ausflug mit seinem Vater zur Müllverbrennungsanlage gefunden hat. Diese Hausaufgabe mit dem Handy ist eine noch recht schultypische Form, informelles Lernen des Alltags in die Schule zu integrieren. Das Handy liefert den Kindern die Möglichkeit, etwas für sie Bedeutsames in ihrer Lebenswelt zu fotografieren, die Fotos mitzubringen und zu präsentieren.

Im Mathematikunterricht der 6. Klasse eines Gymnasiums öffnet die Hausaufgabe, Winkel mit dem Handy zu fotografieren, das Tor zum informellen Lernen. Ein 12-jähriger Junge nimmt mit seinem Handy Fotos mit unklaren, schwer definierbaren Winkeln auf, verknüpft die Fotos zu einem Video und unterlegt dieses Video mit einem Popsong aus *Pokémon* (siehe dazu Eckpunkt 2.6 unten). Der unklare Winkel ergibt sich daraus, wie der Junge die Kameraperspektive nutzt. Später macht der Lehrer die Beziehung von Winkel, Abbild und Perspektive zum Thema einer Lern-Episode. Winkel und Abbildungsperspektive kommen auf diesem informellen Weg in den Unterricht. Die *informelle* Mathematik von *Pokémon* bleibt dagegen weiter ausserhalb der Schule und im Verborgenen der Massenkommunikation. Bei *Pokémon* spielen zwar Winkel keine Rolle; ein entscheidendes Thema von *Pokémon* ist dagegen jedoch die Leistungsmessung in Wettbewerben. Messen bei Wettkämpfen und Leistungsvergleichen sowie die Darstellung von Messergebnissen ist für Jungen bei *Pokémon* ein relevantes Thema. Eine Gruppe von Mädchen stellt eine andere Beziehung zur Massenkommunikation her, indem sie eine von ihnen gespielte Talkshow mit dem Handy aufnehmen. In dieser Experten/-innenrunde versprachlichen sie spielend ihre Ergebnisse zur Handynutzung im Unterricht und mit Bluetooth.

### ***Didaktischer Eckpunkt 2.2: Mit dem Handy Episoden situierten Lernens schaffen***

Das Handy und seine Nutzungsmöglichkeiten bieten neue Formen des situierten Lernens. So lässt sich der vom Lehrer geleitete Unterricht mit Episoden handygestützter Schüleraktivitäten verbinden. Bildlich formuliert, erweitern die Lern-Plätze der Schüler (= Episoden des situierten Lernens) die Lern-Strasse des Lehrers (= Phasen des lehrergeleiteten Lernens).

Ende der 1980er-Jahre entwickelte sich in der US-amerikanischen Pädagogik mit dem *situieren Lernen* (Lave, Wenger 1991) ein theoretisches Modell als Gegenentwurf zum Instruktionslernen, also dem wiederholenden Erlernen vorgegebener Lerninhalte. Ausgangspunkt für diesen Gegenentwurf des situierten Lernens war eine für Sprechtheorie und Semiotik damals selbstverständliche Überlegung, dass Bedeutungen nicht transportiert, sondern immer in Abhängigkeit von der Situation, in der die Menschen denken, handeln und kommunizieren, entstehen. Die Menschen stellen also in ihrer Kultursituation Bedeutung her. Lernen ist eine kulturelle Form der Herstellung von Bedeutungen, in der sich Kinder oder Jugendliche je nach der dominierenden Situation etwas aneignen, weil sie selber Objekten, Emotionen, Vorgängen, Gesprächspartnern und deren Aussagen oder Texten und Medien Bedeutung verleihen. Sie lernen also in der Schule als Schüler; sie lernen vor dem Bildschirm mit Unterhaltungsanspruch oder in einer Werkstatt als Lehr-

ling, weil sie in diesen Situationen aus den vorgegebenen Inhalten und Tätigkeiten für sich Bedeutsames schaffen (Brown et al. 1989, Lave, Wenger 1991, Hanks 1990). In deutschen Schulen dominiert der lehrergeleitete Unterricht, der sich jedoch mit Episoden situierten Lernens bereichern lässt. Das Handy als Instrument der Schüler/innen und Schüler eignet sich, Episoden situierten Lernens in den lehrergeleiteten Unterricht einzufügen. Bei der Erprobung dieses didaktischen *Eckpunktes* war folgende Formel hilfreich: Der Lehrer oder die Lehrerin führt die Schüler/innen entlang einer Lern-Strasse, die sich an den Lernzielen und Lernthemen orientiert. Lehrerin oder Lehrer bietet Schülern/-innen Lern-Plätze (= Episoden). Auf diesen Lern-Plätzen (Episoden des situierten Lernens) beschäftigen sich die Schüler/innen eigenständig mit dem Lernthema.

Im Schulversuch *MyMobile – Handy im Unterricht* war zusätzlich neben der Lehrerin oder dem Lehrer auch noch eine Medienpädagogin oder ein Medienpädagoge mit für Planung und Realisierung des Unterrichts mit Lern-Strasse (lehrer/innengeleiteter Unterricht) und Lern-Plätzen (Episoden situierten Lernens) zuständig. Die Medienpädagoginnen und Medienpädagogen konzentrierten sich vor allem auf die Handy gestützten Episoden situierten Lernens.

#### ***Handy-Station beim Erstlesen und Erstschreiben in der Grundschule***

Beim Erstlesen und Erstschreiben in einer 1. Klasse Grundschule bietet die Lehrerin sowohl bei der Einführung eines neuen Buchstabens oder Lauts als auch in der Phase der Vertiefung situiertes Lernen in der Form des Stationen-Lernens an. Im Sinne der Metapher von Lern-Strassen und Lern-Plätzen (Episoden situierten Lernens) sind Lern-Stationen mehrere Plätze, die die Lehrerin den Kindern öffnet. Die Kinder können z. B. einen Buchstaben kneten oder, in einer anderen Lern-Station, Gegenstände, die den Buchstaben enthalten, mit ihrem Handy suchen und fotografieren. Pro Woche wird ein neuer Buchstabe oder ein neuer Laut eingeführt und vertieft, wobei die Lehrerin mit zwei Typen von Lern-Stationen arbeitet. Auf die Einführungsphase mit sechs Lern-Stationen folgen drei Lern-Stationen zur Übung und Vertiefung (siehe Abbildung 4). Dabei arbeiten die Kinder auch in einer Handy-Station, die einen der möglichen Lern-Plätze in der Lern-Strasse des lehrerinnengeleiteten Unterrichts eröffnet.

## Das Handy als Lern-Station situierten Lernens

### Handy-Station bei der Einführung eines neuen Buchstabens od. Lautes

### Handy-Station bei der Übung und Vertiefung des Sprachgebrauchs



Abbildung 4: Situiertes Lernen als Handy-Station in der Grundschule

Bei der Einführung eines neuen Buchstabens oder Lautes gibt es fünf unterschiedliche Lern-Stationen, an denen die Kinder den Laut bzw. die Buchstaben an die Tafel schreiben, ihn kneten, in Sand schreiben, malen und Übungen im Arbeitsheft machen. Mit dieser Form des situierten Lernens in Stationen sind die Kinder nach einem halben Schuljahr vertraut. Neu für sie ist das Handy als sechste Lern-Station (siehe Abbildung 4). In allen Lern-Stationen arbeiten die Kinder offen und selbstständig, ohne Direktiven der Lehrerin. Die Kinder entscheiden selbst, wann und in welcher Station sie arbeiten. Sie nutzen jedoch alle Lern-Stationen. Sie beschäftigen sich also selbstständig, nach ihren Vorlieben und in ihrem Arbeitstempo mit dem jeweiligen Lernthema. Bei der Handy-Station in der Einführungsphase eines neuen Buchstabens oder Lauts gehen die Kinder z. B. in Gruppen aus dem Klassenzimmer und nehmen im Schulgebäude oder auf dem Schulhof mit dem Handy Fotos auf. Ebenso nutzen sie die Audiofunktion des Handys und sprechen die Wörter, die sie zu den Lauten und Buchstaben gefunden haben, auf ihr Handy. Dabei begleitet sie die Medienpädagogin. Die Begleitung ist vor allem notwendig, wenn die Schüler/innengruppe in der Schulumgebung nach Objekten wie z. B. einer Kirche sucht, die den aktuell wichtigen Laut – in diesem Fall das «ch» – im zugehörigen Wort enthält. Pro Doppelstunde und bei 23 Kindern bleibt für die Handy-Station ca. 15–20 Minuten.

In der Übungs- und Vertiefungsphase bietet das Handy eine von drei Lern-Stationen. In dieser zweiten Unterrichtsphase gibt es zwei Lern-Stationen innerhalb sowie die Handy-Station ausserhalb des Klassenzimmers. Im Klassenzimmer bearbeiten die Kinder Übungen in ihren Arbeitsheften, lösen Aufgaben in den Arbeits-

blättern, die die Lehrerin aus den Fotos der Kinder erstellt hat oder recherchieren draussen wieder mit der Foto- und Audiofunktion des Handys nach Buchstaben und Lauten.

In den fünf Unterrichtswochen mit jeweils zwei Doppelstunden gab es sechs Episoden situierten Lernens, in denen das Handy eine tragende Rolle als Lern-Station spielte:

Episode 1: Namensbilder erstellen. Schüler/Innen fotografieren sich gegenseitig. Die Kinder lernen die Fotofunktion des Handys kennen.

Episode 2: Auf Spurensuche nach dem «sch». Kinder fotografieren Gegenständen und Schriftzügen, in denen sich der Laut «sch» befindet. Sie sprechen diese Wörter aufs Handy (Audiofunktion).

Episode 3: Foto-Safari, Elefantenwörtern entdecken und fotografieren. Die Kinder kleben Fotos zusammen, die jetzt zusammengesetzte Nomenwörter enthalten.

Episode 4: Mit dem *Z-Interview* das z in mehreren Sprachen oder im Dialekt entdecken. Die Kinder nutzen die Audiofunktion bei einem Interview.

Episode 5: *Lischt an oder Licht aus?* Die Audiofunktion des Handys zur Kontrolle der Aussprache verwenden.

Episode 6: Auf Spurensuche nach dem *sp*. Die Kinder gestalten eine Bildergeschichte. Die Foto- sowie Audiofunktion zum Sammeln von Gegenständen oder Schriftzügen nutzen, in denen sich ein *sp* befindet. Aus eigenen Handy-Fotos Bildergeschichten zum *sp* zusammenstellen.

## Handygestützte Episoden des situierten Lernens

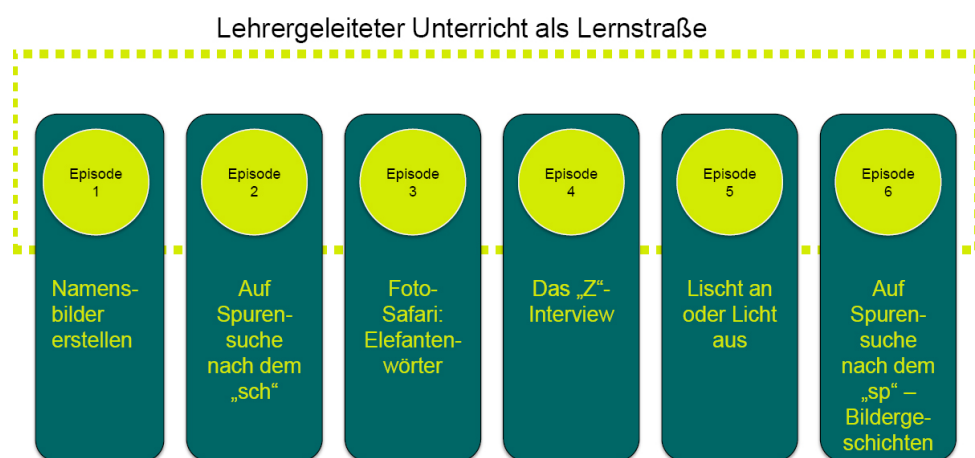


Abbildung 5: Überblick über die Episoden Situieren Lernens in der 1. Klasse der Grundschule. Diese Episoden mit dem Handy gehören zu einer Lern-Station neben anderen Lern-Stationen.

### Mathematik in der 6. Klasse eines Gymnasiums

Im Mathematikunterricht der 6. Klasse eines Gymnasiums über Kugel, Kreis und Winkel gibt es nicht wie im Grundschulunterricht parallele Episoden situierten Lernens mit dem Handy. Stattdessen folgen in der Unterrichtseinheit sechs Lern-Episoden mit dem Handy aufeinander.

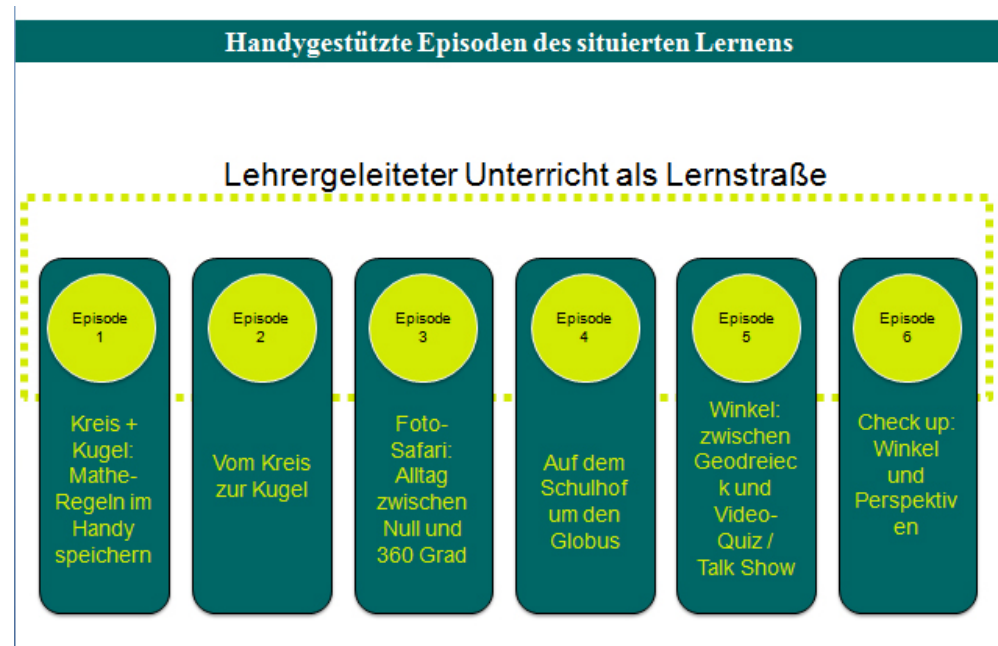


Abbildung 6: Abfolge der Episoden situierten Lernens mit dem Handy in einer Mathematik-Unterrichtseinheit

Lernthema in Episode 1 ist der Unterschied zwischen Kreis und Kugel. Schüler/innen und Schüler setzen dazu das Handy das erste Mal ein; sie speichern mit der Fotofunktion die entsprechenden Regeln auf ihrem Handy. Dazu fotografieren sie das Tafelbild für ihr eigenes Regelheft. In Episode 2 geht es um die Erweiterung dieser Regeln und um Begriffe wie Radius, Durchmesser und Umfang. Hier kommt erneut die Handy-Fotokamera zum Einsatz, um Regeln, Begriffe und Bilder für das eigene Arbeitsheft festzuhalten. Die Hausaufgabe führt dann zu Episode 3. Zunächst nutzen die Schüler/innen die Fotofunktion des Handys, diesmal ausserhalb des Unterrichts. Die Schüler/innen fotografieren wahlweise Kugeln, Kreise und Winkel in ihrer Umgebung. Zur Besprechung dieser Hausaufgabe sichtet die Klasse zusammen mit dem Lehrer die Fotos auf dem interaktiven Whiteboard. Dann schätzen und vermessen sie die Winkel auf dem Whiteboard und im Heft. Ein Videofilm aus der Hausaufgabe wirft Fragen auf und wird danach in Episoden 6 weiter diskutiert. In Episode 4 nutzt die Klasse die GPS-Funktion des Handys um Kugelkoordinaten im Alltag zu entdecken. Episode 5 vertieft die bisherigen



Kenntnisse. Dazu setzen die Schüler/innen die Videofunktion ein, um ein Quiz zu Winkeln zu dokumentieren. In der 6. Episoden fotografieren sie Winkel an einem Modell und bewerten sie in Bezug auf die jeweilige Aufnahmeperspektive.

### ***Didaktischer Eckpunkt 2.3: Mit dem Handy Lern- und Medienkontexte generieren***

Das Handy ist ein Instrument, mit dem Schüler/innen und Lehrer/innen neue Lernkontexte schaffen. Diese Lernkontexte entstehen an der Schnittstelle der Medienkonvergenz von Internet, Unterhaltungsmedien der Lebenswelt und der Schule. Die mit dem Handy generierten Kontexte sind weit über die Schule hinausgreifende Situationen. In diesen Situationen lernen Schüler/innen, indem sie selber ihr Wissen schaffen und Wissen nicht nur übernehmen. Mit dem Handy generierte Kontexte sind Gelegenheiten zum situiereten Lernen, die die Lern-Strassen der Schule zu Lern-Plätzen erweitern. Das Handy verbindet diese Lern-Plätze mit der vernetzten Medienwelt.

### ***Geocachen, die Ausweitung des Lernkontextes über die Klassenräume hinaus in die neue digitale Welt des Messens***

Im Mathematik-Unterricht der 6. Klasse des Gymnasiums geht es um das Lernthema Kreis, Kugel, Kugelkoordinaten und Winkel. Der Lehrer bietet den Schüler/innen und Schülern die Episode *Geocachen*, in der sie nicht nur Winkel praktisch erkunden, sondern darüber hinaus ihre Schule mit den digitalen Landkarten der Satellitenortung verbinden (vgl. Teil 3, Eckpunkt 3.3). Das Handy als Instrument der Schüler/innen und Schüler ‚dockt‘ die Schule an die digitalen geographischen Netze und GPS an. Offensichtlich ist, dass die Schüler/innen und Schüler das Klassenzimmer verlassen und auf dem Schulhof mit ihrem Handy navigieren. Zum Lernkontext Klassenzimmer kommt der Schulhof als Lernkontext hinzu. Der Lernkontext kann sich auch noch um den Raum der Stadt erweitern, indem die Schüler/innen und Schüler die Koordinaten markanter Punkte ihrer Stadt vermessen und dazu gezielt die Schule verlassen.

Zum Vorgehen: Mit einem Globus auf dem Schreibtisch eröffnet der Lehrer das Thema. Das Whiteboard ermöglicht dann, auch ein Bild vom 50. Breitengrad im 35 km entfernten Mainz einzubeziehen. Die Schüler/innen schätzen die Koordinaten der Schule und «fangen» diese per GPS auf dem Schulhof ein. Über GPS können die Schüler/innen ihre Standortkoordinaten selbst herausfinden und am interaktiven Whiteboard mit Google Earth im Internet überprüfen. Medienkonvergenz, Lebenswelt und Schule verzahnen sich in dieser Episode.



Abbildung 7: Mit dem Handy den Lernkontext vom Klassenzimmer in den Schulhof und zu Google Earth erweitern (Episode 4)

**Didaktischer Eckpunkt 2.4: Mit dem Handy Kommunikationsbrücken und Kommunikationsketten schaffen**

Das Handy und seine Nutzungsmöglichkeiten bieten Kommunikationsbrücken und Kommunikationsketten zwischen Alltag und Schule. Kommunikationsbrücken und Kommunikationsketten sind Verbindungslinien zwischen dem richtigen Leben ausserhalb der Schule und dem schulischen Lernen.

**Mathematik im Alltag – Basiswissen «Winkel schätzen und benennen»**

Die Hausaufgabe ist eine einfache Methode, um mit dem Handy eine Kommunikationsbrücke zwischen dem Unterricht in der Schule und der Lebenswelt der Schülerinnen und Schüler zu schlagen. Konkret geht es darum, Winkel zu schätzen und zu benennen. Die Schüler/innen bekommen den Auftrag, verschiedene Winkel zu fotografieren oder ein Handy-Video zu erstellen. Ein Schüler bringt Fotos mit rechten Winkeln aus seinem Wohnzimmer mit, ein anderer Winkel der Dachrinne aus seinem Garten. Die persönliche Lebenswelt der Schülerinnen und Schüler kam damit in den Blick des Unterrichts. Der Stolz des betreffenden Schülers ihre Welt in die Schule hereinzunehmen, war dabei spürbar. In diese Handy-Hausaufgaben mischen die Kinder auch ihre persönlichen Themen. So *unterfüttert* ein Schüler sein Winkel-Video mit einem Popsong von *Pokémon*, was nur auf den ersten Blick nicht zu Mathematik gehört. Schon ein genauer Blick in die Logik von *Pokémon* genügt, wie oben schon gesagt, um dort das Thema Leistungsmessung mit Zahlen wahrzunehmen. Das ist Teil eines geschlechtsspezifischen Themas von Jungen, das etwas mit der Motivation für den Mathematikunterricht zu tun hat. Diese Motivationsbrücke zwischen Alltag und Schulunterricht liesse sich vom Lehrer eventuell nutzen.

***Didaktischer Eckpunkt 2.5: Mit dem Handy die Schülerinnen und Schüler als Experten ihres Alltagslebens in der Schule individuell aktiv werden lassen***

Im Prozess der Individualisierung und Fragmentierung unserer Gesellschaft werden Schülerinnen und Schüler zu vielfältigen Alltagsexperten. Dabei spielt das ständig verfügbare Handy eine wichtige Rolle. Die Nutzung des Handys auf den Lern-Strassen des geleiteten Lernens und in den Episoden des situierten Lernens (Lern-Plätze) unterstützt, die vielfältigen Handlungs- und Lernmuster der Schülerinnen und Schüler auch für den Lernerfolg in der Schule fruchtbar zu machen.

***Experten/-inneninterviews und Spurensuche in der Grundschule***

Im Lese- und Schreibunterricht der Grundschule spielt der regionale Dialekt und die nicht-deutsche Familiensprache eine erhebliche Rolle. In der 1. Klasse der Grundschule in Ludwigshafen, aus deren Unterricht die Beispiele stammen, sprechen die Kinder in ihren Familien neben Deutsch auch Italienisch, Polnisch, Türkisch, Russisch und natürlich Pfälzer Dialekt. Die Kinder sind daher Experten/-innen ihres Dialekts und ihrer nicht-deutschen Familiensprache. Das Handy gibt den Kindern die Chance diese Experten/-innenkompetenz in den Unterricht zu tragen. Um diese Kompetenz in den Erstlese- und Erstschriftunterricht einzubringen, eignen sich Partner/-inneninterviews mit dem Handy. In der Lern-Station mit dem Handy in der Übungs- und Vertiefungsphase (siehe Abb. 4) führen die Kinder paarweise ein kurzes Interview, bei dem es um den Laut des neuen Buchstabens z in der deutschen wie auch der Familiensprache geht. Die Kinder bringen als Hausaufgabe ein Wort ihrer Familiensprache mit, in dem der Laut z zu hören ist. Im Interview tauschen sich die Kinder über diese Z-Wörter aus. Ihre Aufgabe: Finde heraus, welches deutsche Wort dem ausländischen entspricht und ob der Laut dann immer noch zu hören ist! Mit der Audiofunktion des Handys nehmen die Kinder das Wort auf und erklären, aus welcher Sprache es kommt und was es bedeutet. Die Kinder bekommen so zum einen ein Gespür für Sprache und zum anderen werden Kinder mit nicht-deutscher Familiensprache und wenig Erfahrungen im Deutschen in dieser Lern-Episode im Deutschunterricht zum Sprachexperten. Kinder nutzen dieses Expertenwissen, um beispielsweise eigene Anlauttabellen in ihrer Muttersprache zu erstellen.



Abbildung 8: Experteninterview anhören Deutsch/GRunDschule

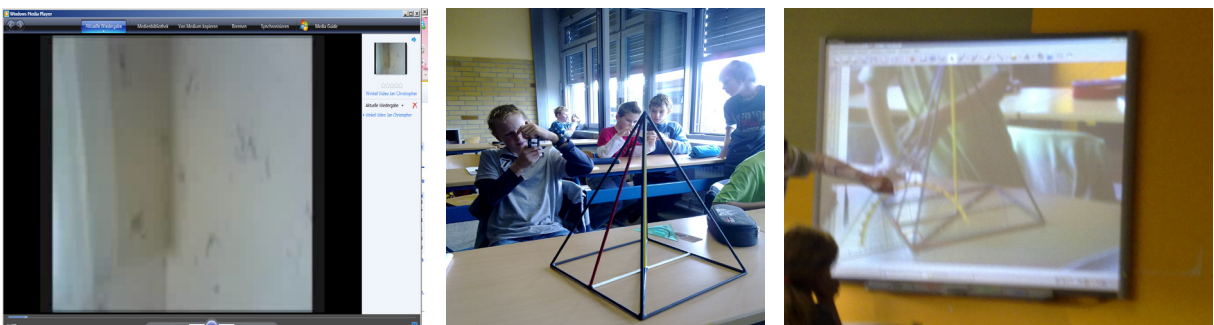
Kinder sind auch Experten/-innen ihres regionalen Dialekts. Im Pfälzischen fällt Kindern die Unterscheidung von *sch* und *ch* schwer. Mit dem Handy können sie auf Spurensuche nach dem *sch* gehen. Die Spurensuche läuft mit Hilfe der Fotofunktion des Handys. Die Kinder fotografieren Dinge und Wörter, die ihnen begegnen und in denen ein *sch* zu finden ist. Je nach Entwicklungsstand der Kinder und aufgrund der freien Wahlmöglichkeit, was fotografiert wird, entstehen auch Fotos von Dingen, die nur vermeintlich mit einem *sch* geschrieben werden. Dialekt sprechende Kinder machen aus *Kirche* oder *Licht* die *Kirsche* oder das *Lischt*. Hier unterstützt die Audiofunktion des Handys das Partner/inneninterview und ist bei der Kontrolle der Aussprache hilfreich. Die Ludwigshafener Kinder sammeln Fotos und Tondokumente von z. B. *Milch*, *Mädchen*, *Kirche*, *Licht*, *Schiff*, *Schokolade*, *Schule*, *Schildkröte*, *Tisch*. In ihrer Sammlung tauchen Wörter auf wie *ich*, *nicht*, *Vergleich*, *sechzehn*, *vielleicht*, *auch*. Es sind Wörter die sich nur mit Hilfe der Audiofunktion sammeln und nicht fotografieren lassen.

***Didaktischer Eckpunkt 2.6: Mit dem Handy sensible Entwicklungs- und Lernkontexte schaffen***

Die von Kindern generierten Kontexte der mobilen, individualisierten, konvergenten Medienwelt stehen in der Regel in engem Zusammenhang mit ihren persönlichen Entwicklungsthemen und lassen sich auch nutzbringend in die Lernsituation integrieren. Dabei gilt es genau hinzusehen und zu entscheiden, welche Themen sich zum Nutzen der jeweiligen Kinder aufgreifen lassen.

### *Im Mathematikunterricht das Thema Unklarheit aufgreifen*

Bei der Messung von Winkel geht es um Genauigkeit und Eindeutigkeit, was nicht mit der spontanen Herangehensweise von Kindern an Messen und Winkel zusammenpassen muss. Der leitende Gedanke für die sensiblen Entwicklungs- und Lernkontext kommt von Lev Vygotsky (1978 / 1930). Vygotsky ging davon aus, dass Lernen von Sachverhalten nur dann möglich ist, wenn es in die Lebensperspektive der Kinder passt; anders formuliert, wenn die Kinder bereit und in der Lage sind, sich mit Lernthemen zu beschäftigen. Dazu brauchen die Kinder als Schüler/innen unter anderem einen Kontext, der auf ihre Themen und Erlebnisweisen positiv fördernd; mit anderen Worten, der sensibel auf die Kinder und ihre aktuelle Entwicklung eingeht. Das Handy als Teil der Lebenswelt der Kinder ist in der Lage, solch einen sensible Entwicklungs- und Lernkontext mit herzustellen. So hat der Schüler im schon angesprochenen Beispiel seine Winkel-Fotos aus der Hausaufgabe zu einem Video zusammengesetzt. Eines dieser Bilder (Abb. 9, linkes Foto) zeigt den 90-Grad-Winkel der Wohnzimmerecke. Auf diesem Foto ist dieser Winkel nur schwer zu erkennen. Mathematisch gesehen taugt dieses Foto wenig als Messergebnis, weil der Winkel nur unscharf und mehrdeutig abgebildet ist. Der Lehrer reagiert positiv unterstützend auf dieses, auf den ersten Blick untaugliche Foto, erkennt doch, dass der Junge mit der Unklarheit von Abbildungen spielt. Der Lehrer sieht die Chance, das Thema der Abbildung und die Mehrdeutigkeit von Abbildungen in den Unterricht hereinzunehmen. Die Frage, weshalb der abgebildete Winkel auf dem Foto nicht mehr mit der Realität übereinstimmt, bekommt in der Episode 6 über Winkel und Perspektiven jetzt auch Raum im Unterricht. Schüler/innen fotografieren die Winkel einer Pyramide aus unterschiedlichen Blickwinkeln (Abb. 9, Foto Mitte). Der Lehrer diskutiert die Ergebnisse auf dem Whiteboard (Abb. 9, rechtes Bild). Mit dem Handy entsteht ein Raum, der von der Zimmerecke zu Hause, über die Erprobung der Perspektiven um Pyramiden-Winkel aufzunehmen bis hin zur Erläuterung durch den Lehrern mit Hilfe des Whiteboards rechts. Dieser Raum funktioniert als Entwicklungsraum, in dem der Junge von seiner unklaren Abbildung den Schritt zu eindeutigen mathematischen Abbildungen mitgehen kann.



**Abbildung 9:** Unklarer Winkel als Ergebnis der Hausaufgabe (links); mit Hilfe der Fotografie Perspektiven und Winkel einer Pyramide erkunden (mitte), Fotos von Winkeln am Whiteboard vermessen (rechts)

In der Episode 6 fotografieren die Schüler/innen Pyramiden-Modelle aus unterschiedlichen Perspektiven (Abb. 9 Mitte). Hier taucht das gleiche Phänomen wie bei der Hausaufgabe auf. Fotos aus unterschiedlichen Perspektiven ergeben unterschiedliche Winkel. Auf dem interaktiven Whiteboard sammeln und erörtern die Schülerinnen und Schüler die Fotos ihrer Gruppenarbeit, die der Lehrer mit ihnen erörtert.

### Überblick über die Eckpunkte einer Didaktik des Mobilen Lernens

Am Schulversuch *MyMobile – Handy im Unterricht* nahmen sechs Schulen mit unterschiedlich langen Unterrichtseinheiten teil. Dazu gehören die beiden hier skizzierten Unterrichtseinheiten in einer Grundschule und in einem Gymnasium. In diesen beiden Unterrichtseinheiten gab es jeweils sechs Episoden situierten Lernens, in denen das Handy eine tragende Rolle spielte.

Die folgenden Abbildungen 10 und 11 geben einen Überblick über diese Handy-Episoden und die didaktischen Funktionen, die sich mit dem Handy in diesen Episoden realisieren liessen. Die hier kurz skizzierten *Eckpunkte einer Didaktik des mobilen Lernens* sollen helfen, die didaktischen Funktionen des Handys zu operationalisieren. Auch wenn diese Operationalisierung nur ein erster und heuristischer Versuch einer empirischen Kontrolle ist, so zeigen die beiden folgenden Listen doch die didaktischen Chancen des Handys als Instrument des situierten Lernens.

Eckpunkte einer Didaktik mobilen Lernens	
Episoden	Eckpunkt
1) Namensbilder	- Situiertes Lernen (2.2) - Foto (3.2), Speicher (3.4)
2) Auf Spurensuche nach dem „Sch“	- Situiertes Lernen (2.2), Sensible Entwicklungs- und Lernkontexte (2.6) - Foto/Audio (3.2), Speicher (3.4)
3) Foto-Safari: Elefantenwörter	- Situiertes Lernen (2.2), Informelles Lernen integrieren (2.1) in Form von Hausaufgaben - Foto (3.2), Speicher (3.4)
4) Das „Z“ – Interview	- Situiertes Lernen (2.2), Experten des Alltags (2.5) - Audio (3.2), Speicher (3.4)
5) Licht an oder Licht aus	- Situiertes Lernen (2.2), Sensible Entwicklungs- und Lernkontexte (2.6) - Audio (3.2), Speicher (3.4)
6) Auf Spurensuche nach dem „sp“ - Bildergeschichten	- Situiertes Lernen (2.2), Sensible Entwicklungs- und Lernkontexte (2.6) - Foto/ Audio (3.2), Speicher (3.4)

Abbildung 10: Überblick über die didaktischen Eckpunkt im Erstlese- und Schreibunterricht der Grundschule

Auswertung/ Bezug: Eckpunkte einer Didaktik mobilen Lernens	
Episoden	Eckpunkt
1) Kreis + Kugel. Mathe-Regeln im Handy speichern	- Alltagsexperten (2.5)  - informelles Lernen (2.1) - Kommunikationsbrücke (2.4) - sensible Entwicklungs-/Lernkontexte (2.6)
2) Vom Kreis zur Kugel	- sensible Entwicklungs-/Lernkontexte (2.6)
3) Foto-Safari: Alltag zwischen Null und 360 Grad	- Alltagsexperten (2.5)
4) Auf dem Schulhof um den Globus	- situiertes Lernen (2.2), - Alltagsexperten (2.5), - Lern- und Medienkontexte generieren (2.3)
5) Winkel: zwischen Geodreieck und Video-Quiz/Talk Show	- situiertes Lernen (2.2) - Alltagsexperten (2.5)
6) Check up: Winkel und Perspektiven	- Kommunikationsbrücke (2.4), Alltagsexperte (2.5), sensible Entwicklungs-/Lernkontexte (2.6),

Abbildung 11: Überblick über die didaktischen Eckpunkte in der Unterrichtseinheit über Kreis, Kugel, Winkel im Gymnasium

Wirft man zusätzlich einen Blick auf die didaktischen *Eckpunkte* in allen Episoden der bisher ausgewerteten fünf von sechs Projektschulen (Abbildung 12) so zeigt sich, dass sich Eckpunkt 2.2: Situiertes Lernen, sowie Eckpunkt 2.5: Experten des Alltags, am einfachsten in den Unterricht integrieren liessen. Lehrerinnen und Lehrer gelingt es, mit den Handys ihrer Schüler den Unterricht erfolgreich zu öffnen, indem sich Schüler/innen eigenständig mit einem Lernthema befassen und ihr naives, alltägliches Expertenwissen zur individuellen Umsetzung des Lernthemas einsetzen. Auch die sensiblen Entwicklungs- und Lernkontexte (Eckpunkt 2.6) liessen sich in den Unterricht einbinden. Darüber hinaus ist es gelungen, *Kommunikationsbrücken und Kommunikationsketten* zwischen dem Schüleralltag und dem Unterricht zu schlagen (Eckpunkt 2.4). Für die Schule scheint es dagegen auch mit dem Handy schwierig zu sein, informelles Lernen in die Schule einzubinden (Eckpunkt 2.1: Informelles Lernen in die Schule integrieren).



Abbildung 12: Überblick über die didaktischen Eckpunkte aller Unterrichtseinheiten

### 3 Die multimediale Funktionsvielfalt des Handys – sechs Eckpunkte zu den Nutzungsfunktionen des Handys

In den beiden hier diskutierten Unterrichtseinheiten in der Grundschule und im Gymnasium des Schulversuchs *MyMobile – Handy im Unterricht* verfügten die Schülerinnen und Schüler über zwei Typen von Handys, zum einen über ihr persönliches Gerät, zum anderen über das Nokia N85<sup>6</sup>, das sie für die Zeit der Unterrichtseinheit als *Projekt-Handys* bekamen. Im der sechsten Klasse des Gymnasium hatten die meisten der Schülerinnen und Schüler ein eigenes Handy. In der ersten Grundschulklasse nutzten dagegen alle Kinder in der Schule die *Projekt-Handys*, bei Hausaufgaben auch die Handys der Eltern.

Ohne die technischen Funktionen eines Handys zu bedenken, lässt sich Unterricht nicht sinnvoll planen. Um die technische Funktionalität zu operationalisieren, gibt es deshalb neben den sechs *Eckpunkten zur Didaktik des mobilen Lernens* auch sechs *Eckpunkt zu den Nutzungsfunktionen des Handys*.

Das Handy als mobiler Minicomputer bietet mit seiner Multifunktionsfähigkeit verschiedene Ansatzpunkte für unterschiedliche Lernzwecke. Für die technischen Anwendungen, die heute in einem Handy stecken, hätten Pädagogen/-innen in den 1980er-Jahren eine Vielzahl einzelner Geräte in den Unterricht nutzen müssen. Mit der neuen Generation der Handys stehen breite Nutzungsmöglichkeiten zur Verfügung. Dabei unterscheiden sich die Handys der Schüler/innen erheblich von einander.

Der Einsatz der Handy-Funktionen in den Episoden der beiden Unterrichtseinheiten von *MyMobile – Handy im Unterricht* ist vielfältig. Je nach Alter der Schüler/innen und Lernzweck gibt es unterschiedliche Gewichtungen der Handy-Funktionen. Die Erfahrungen aus den ausgewertete Unterrichtseinheiten von *MyMobile – Handy im Unterricht* zeigt, dass sich die ständige Verfügbarkeit des Handys (Eckpunkt 3.1) sowie die aktiven Medienfunktionen Foto, Video und Audio (Eckpunkt 3.2) erfolgreich im Unterricht einsetzen lassen. Demgegenüber spielt Eckpunkt 3.5, die Möglichkeiten zur persönlichen Kommunikation mit SMS, eher eine untergeordnete Rolle. Zwar sind gerade diese Funktionen in den ausserschulischen Aktivitäten der Schüler/innen wichtig, ihre Nutzung ist allerdings mit Kosten verbunden, die die Schülerinnen und Schüler im Unterricht vermeiden. Die alltägliche Nutzungsfunktion wie Absprachen zu treffen oder Verabredungen zu vereinbaren, waren für den Unterricht nicht wichtig. Ein Grund dafür ist, dass die Klingeltöne beim Anrufen den Unterricht stören.<sup>7</sup>

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6 Diese Entscheidung basiert auf der Empfehlung des «Medienpädagogik Praxisblog» <http://www.medienpaedagogik-praxis.de/2009/09/07/das-beste-handy-fur-die-medienpadagogik/>

7 Für Hausaufgaben bieten sich sogenannte Cellcast an. Sie wurden jedoch im Rahmen des Schulversuchs *MyMobile – Handy im Unterricht* nur einmal genutzt. Cellcasts sind digitale Anrufbeantworter im Internet. Die Anmeldung einer solchen Mailbox ist kostenlos. Eine Schulklasse kann mehrere Nummern anmelden und ihre Nachrichten, Fragen oder Interpretation von zuhause aus auf diese Mailbox sprechen. Mehr unter [www.cellcast.de](http://www.cellcast.de). Es entstehen Kosten für ein Gespräch ins Festnetz.



Die Schülerinnen und Schüler nutzen die Funktionen zur Alltagsorganisation (Eckpunkt 3.3) mit Wecker und Kalender ähnlich häufig wie die hohe Speicherkapazität (Eckpunkt 3.4). Auch das Handy als Schnittstelle zum Internet (Eckpunkt 3.6) war eine im Unterricht genutzte Handy-Funktion. Da der Internetzugang über das Handy zum Teil mit hohen Kosten verbunden ist, reduzierte sich diese Möglichkeit doch deutlich zu Gunsten des Schul-PCs.<sup>8</sup> Dagegen ist die Konvergenz mit dem interaktiven Whiteboard im Gymnasium wichtig. Als technisch einfache und kostenlose Technik hat sich dabei die Datenübertragung per Bluetooth erwiesen. Besonders die Foto-Ergebnisse aus Kleingruppen lassen sich auf diese Weise zusammenführen. Die Gruppenarbeit mit dem Nokia N85 ermöglicht den direkten Anschluss des Handys mit einem Cinch-Kabel an das Whiteboard. Diese Konvergenz hat sich für das Erarbeiten der Unterrichtsthemen als fruchtbar heraus gestellt.

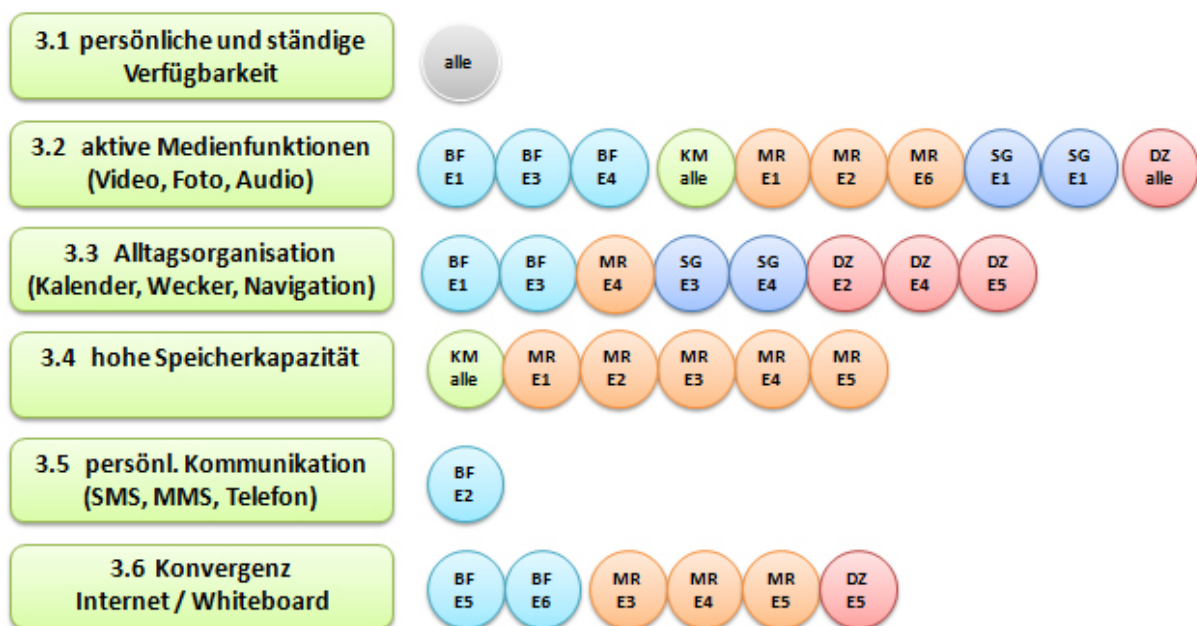


Abbildung 13: Überblick über die Handy-Funktionen aller fünf ausgewerteten Unterrichtseinheiten Von *Mymobile – Handy im Unterricht*. Dazu gehören auch die hier diskutierten beiden Unterrichtseinheiten In Der Grundschule (Erstlesen, Erstschreiben) und im Gymnasium (Mathematik)

### Eckpunkt 3.1: Persönliche und ständige Verfügbarkeit

Laut *KIM-Studie: Kinder und Medien* (Medienpädagogischer Forschungsverbund Südwest 2008), verfügen 19% der 6- bis 7-Jährigen, 34% der 8- bis 9-Jährigen, 66% der 10- bis 11-Jährigen und 86% der 12- bis 13-Jährigen über ein Handy. Die

<sup>8</sup> In einer Unterrichtseinheit in einer Hauptschule wurde ein Handy-WLAN-Netz für den Schulversuch eingerichtet.

gleiche Entwicklung zeigt sich auch in der JIM-Studie von 2009: *Jugendliche und Medien* (Medienpädagogischer Forschungsverbund Südwest 2009), die die Mediennutzung von 12- bis 19-Jährigen repräsentativ erfasst. 95 % der Jugendlichen haben ein eigenes Handy. Mädchen sind mit 97 % etwas besser ausgestattet als Jungen (93%). Bereits 88 % der 12- und 13-Jährigen besitzen ein Handy. Bei den über 18-Jährigen herrscht mit 99 % Vollversorgung (14 bis 15 Jahre: 96 %, 16 bis 17 Jahre: 97 %).

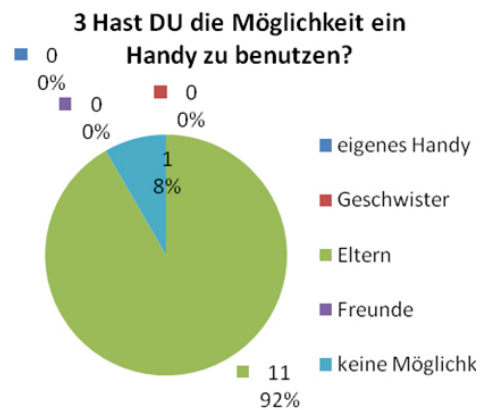


Abbildung 14: Auszug aus der Evaluation Deutsch/ Grundschule

Diese Verteilung des Handys hat sich auch bei der Befragung der Projektklassen von *MyMobile – Handy im Unterricht* bestätigt. In der sechsten Klasse Mathematik am Gymnasium verfügten die Schüler/innen (N=14) fast alle (93%) über ein eigenes Handy (Abbildung 15). Wohingegen in der ersten Klasse der Grundschule lediglich ein Kind (N=12) angab, ein eigens Handy zu besitzen (Abbildung 14). Deswegen bekamen die Grundschulkinder auch die für den Schulversuch angeschafften sog. *Projekt-Handys*.

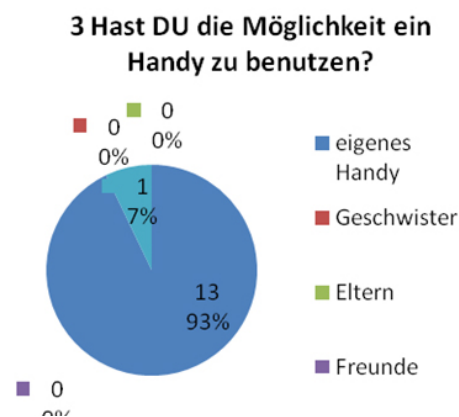


Abbildung 15: Auszug aus der Evaluation Mathematik/ Gymnasium

**Eckpunkt 3.2: Aktive Medienfunktionen für Video, Foto, Audio / Musik**

Die aktiven Medienfunktionen des Handys Video, Foto und Audio / Musik, sind bei Kindern und Jugendlichen sehr beliebt und werden häufig genutzt. Die Evaluation von *MyMobile – Handy im Unterricht* zeigt, dass Kinder der sechsten Klasse Mathematik diese Funktionen annähernd gleich oft nutzen (Abbildung 16).

Obwohl die Grundschüler/innen in der Regel über kein eigenes Handy verfügen, sind sie mit den aktiven Medienfunktionen der Projekt-Handys schnell vertraut, nicht zuletzt weil sie vor allem die Fotokamera in den Handys der Eltern schon häufiger genutzt haben (Abbildung 17). Mit diesen Erfahrungen nutzen die Schülerinnen und Schüler die aktiven Medienfunktionen im Unterricht auch häufig (vgl. Abbildung 13). Die meisten Handys verfügen mittlerweile über eine einfach zu bedienende Foto- und Videokamera, die gute Qualität liefert. Das Handy ermöglicht aber auch Varianten wie das Einsprechen von Sprachmemos oder die Übertragung von Bildern via Bluetooth. Diese technischen Varianten erweitern in höheren Klassenstufen das Handlungsfeld für Schülerinnen und Schüler signifikant. In der Grundschule waren vor allem Foto- und Audiofunktion von zentraler Bedeutung, weil Foto und Audio für jüngere Kinder intuitiv bedienbar und wenig fehleranfällig sind. Warum keine Digitalkamera statt Handy verwenden? Der Vorteil des Handys liegt in der Breite der aktiven Medienfunktionen in einem Gerät. Schüler/innen können deshalb viel flexibler einzelne Funktionen nutzen.

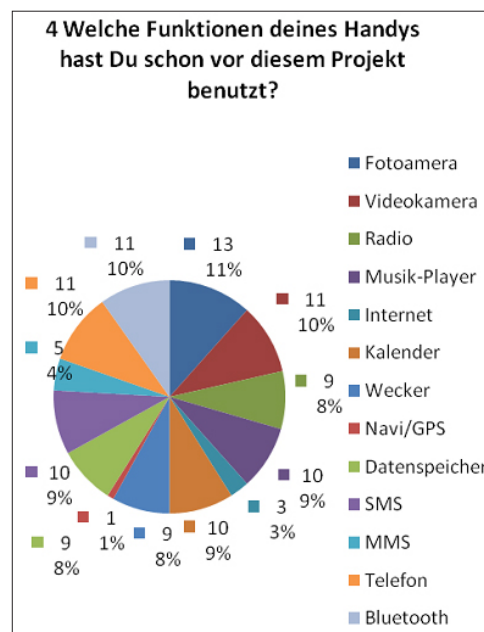


Abbildung 16: Auszug aus der Evaluation Mathematik im Gymnasium

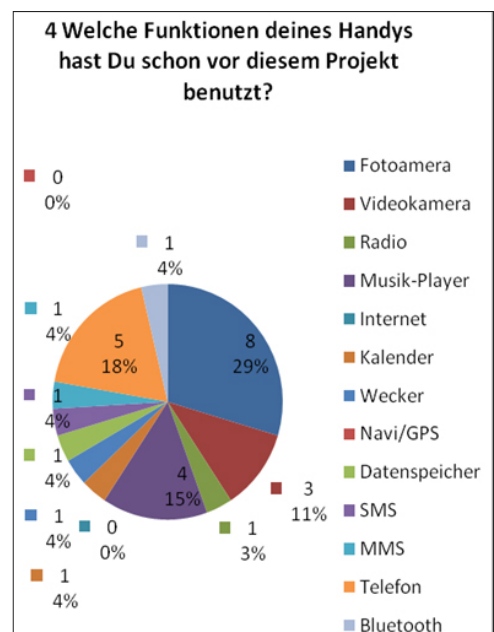


Abbildung 17: Auszug aus der Evaluation des Erstlesens und -schreibens in der Grundschule

### **Fotografiere Deine Welt! – Die Fotofunktion in der Grundschule**

Die Fotokamera des Handys dient als Lupe oder Fernglas, um die Umwelt zu erkunden und zu entdecken. Die Kinder erhalten einen Arbeitsauftrag («Fotografiere Dinge, in denen ein Sch vorkommt») und ziehen anschliessend selbstständig mit dem Handy los. Die so von den Kindern produzierten Fotos bieten Anlässe für Gespräche. Sie zeigen auch den unterschiedlichen Entwicklungsstand der Kinder auf. Die Lehrerin integriert die entstandenen Fotos in Form von Arbeitsblättern in den Unterricht. Die Kinder sind motiviert, weil sie ihre eigenen Fotos wieder entdecken und zum gemeinsamen Lernen einsetzen. Das führt zu einem höheren Lernerfolg. Die Kinder arbeiten nicht nur am vorgegebenen Stoff im Schulbuch oder auf dem Arbeitsblatt, sondern an ihren eigenen Fotos zu Anfangs-, Mittel- und Endlauten. Die bekannten Gegenstände aus dem unmittelbaren Umfeld der Kinder werden damit zu Lernhilfen. Kinder verstehen sehr schnell, was sich auch ausserhalb der Schule entdeckend lässt. Sie vertiefen durch diese Aktivitäten spielerisch auch ausserhalb der Schule die Lernthemen (siehe Abb. 18).



Abbildung 18: Fotografieren mit dem Handy in der Grundschule

### **Wie hört sich das an? – Die Audiofunktion in der Grundschule**

Grundschul Kinder nutzen die Audiofunktion des Handys vor allem passiv als Musikplayer (vgl. Abbildung 17). Eines der Ziele der Medienkompetenzförderung besteht darin, Medien auch aktiv zu verwenden. Deshalb geht es beim Erstlesen und Erstschreiben auch darum, den Erstklässlern/-innen diese Funktion nahe zu bringen. Die eigenen Lese- und Hörversuche bei *Elefantenwörtern* oder von Wörter mit *sch*, die sie fotografiert hatten, nehmen die Kindern schnell und begeistert an. Auf der Suche nach Gegenständen oder Begriffen mit bestimmten Buchstaben oder Lauten, fallen manchen Kindern Begriffe ein, die sie nicht als Foto festhalten können, da sie nicht im Schulhaus zur Verfügung stehen, zum Beispiel *Apfelsaft-*

*schorle, Schädel, Fisch*. Mithilfe der Audiofunktion sprechen die Kinder diese Begriffe auf das Handy und tragen sie mit dem Handy in den Unterricht.

In der Grundschule gibt es einige Kinder, die mit dem Schriffterwerb Schwierigkeiten haben und streckenweise nicht schreiben wollen. Diese Kinder bekommen mit dem Handy einen alternativen Zugang zu den relevanten Wörtern und Lauten. Sie analysieren die gehörten Wörter, indem sie sie aussprechen und dabei die Stellung verschiedener Buchstaben hörend kontrollieren. Mit dieser Hör-Analyse lässt sich auch die Familiensprache und der regionale Dialekt in den Unterricht hereinnehmen, indem andere Schülerinnen und Schüler oder die Lehrerin einen Ausspracheunterschied thematisieren und dann die richtige Schreibweise an der Tafel festhalten. Beim Einsatz der Audiofunktion fiel auf, dass sonst eher stille Kinder sich aktiv beteiligen und begeistert Wörter in das Handys sprachen. In der Episode 4, beim *Z-Interview*, bekommt die Audiofunktion eine Schlüsselfunktion (siehe Abb. 17).



Abbildung 19: Sprachaufnahmen in der Grundschule

### ***Eckpunkt 3.3: Anwendungen für die Alltagsorganisation: Kalender, Wecker und Navigation***

In den Bereich der Alltagsorganisation des Handys fallen Anwendungen wie Kalender, Wecker, auch der Rechner und die Navigation. Im Alltag nutzen die Schüler/innen diese von Handys unterschiedlich angebotenen Funktionen. Von den 12-jährigen Schüler/innen im Gymnasium geben 3% Internetzugang an. 8% sagen, sie nutzen den Wecker und 1% gibt an, Navi / GPS haben (Abb. 16). Die Grundschulkinder sagen, dass sie zu 4% den Wecker, 0% das Navi / GPS und 4% den Kalender verwenden (Abb. 17).

In vielen der Episoden setzten die Schüler/innen die Stoppuhr ihres Handys ein, um ihre Zeit für die Einzel- oder Gruppenarbeit festzulegen.

### ***Auf dem Schulhof um die Welt – GPS im Mathematik-Unterricht***

Der Mathematik-Unterricht der 6. Klasse beschäftigt sich u. a. mit den Lernthemen *Vom Kreis zur Kugel* sowie *Winkel zeichnen und messen*. In diesen Lernzusammenhang gehören auch Kugelkoordinaten (Lergenmüller, Schmitt S. 49, Aufgabe 19). Mit Hilfe von GPS können die Schüler/innen den praktischen Nutzen von Kugelkoordinaten im Alltag ausprobieren und den Transfer zur Mathematik leisten. Die Unterrichtsstunde leitet der Lehrer ein. Im Anschluss folgt eine handygestützte Gruppenarbeit auf dem Schulhof, bei der die Schüler/innen selbst Koordinaten über GPS suchen. In dieser Phase verbindet sich das Handy mit Satelliten und empfängt die Position der Schüler/innen auf dem Schulhof. Zurück im Klassenzimmer geben die Gruppen ihre Daten über das interaktive Whiteboard in die Internetanwendung *Google Earth* ein und prüfen ihre Daten darauf hin, ob sie korrekt sind (siehe Abb. 7).

### ***Eckpunkt 3.4: Hohe Speicherkapazität für vielfältige Darstellungsformen***

Handys verfügen neben einem internen Datenspeicher auch über auswechselbare Speicherkarten. Diese Speicherkarten, sogenannte Micro-SD- oder SD-Karten sind in verschiedenen Grössen verfügbar und standardmässig im Lieferumfang der Handys enthalten. Diese Speicherkarten fungieren ähnlich wie USB-Sticks und ermöglichen auch das Speichern von grösseren Datenmengen. Der Austausch von Dateien wie Foto-, Video- und Audioformaten ist mit dieser erweiterbaren Speicherkapazität komfortabel und technisch meist einfach zu handhaben. Aber auch ohne diese Erweiterungen bietet die Mehrzahl der Handys die für Bild- und Videodateien notwendige grosse Speicherkapazität. In der ersten Klasse der Grundschule gibt es deswegen auch keine technischen Grenze, als Kinder sich ihren Wortschatz in ihrer Lebenswelt suchten und dabei in Episode 2 beliebig viele geschriebene Wörter mit dem *sch* fotografierten, in Episode 3, der Foto-Safari, *Elefantenwörter* (zusammengesetzte Nomen-Wörter) entdeckten und fotografierten. In Episode 2 bringt ein Mädchen gleich 15 Fotos von zuhause mit. In Episode 3 präsentiert ein Junge stolz seine mitgebrachten Fotos mit den extrem langen Substantiven *Abfallwirtschaftsgesellschaft* und *Müllheizkraftwerk* (siehe Abb. 3). Auf diese *Elefantenwörter* war er beim Wochenendspaziergang mit dem Vater gestossen. Das väterliche Handy erlaubt es dem Sohn, neu entdeckte komplizierte Wörter mit in die Schule zu bringen. Aus seinen Handyfotos wählt er zwei aus und präsentiert sie in der Klasse. In Episoden 4 (*Z-Interview*, das *Z* in den Familiensprachen und im Dialekt) sammeln die Kinder mit der Audiofunktion gesprochene Wörter. In Episode 5 (*Lischt an oder Licht aus?*) gibt es für die Schüler/innen-Interviews mit der Audio-Funktion des Handys ebenfalls keine technischen Begrenzungen.

**Eckpunkt 3.5: Zugang zu einer vielfältigen persönlichen Kommunikation (SMS, MMS, Telefon)**

Bei den sechs Unterrichtseinheiten des Schulversuches *MyMobile – Handy im Unterricht* sollte den Schülerinnen und Schülern keine Kosten für Telefonieren, SMS oder MMS entstehen, weshalb sie, falls sie keine *Flat-Rate* hatten, die Projekt-Handys nutzten. Daten übermittelten sie per Datenkabel oder Bluetooth. Telefonate waren während des Unterrichts wegen der damit einhergehenden Störung nicht erwünscht. Schülerinnen und Schüler verfassten mit der Notizfunktion Nachrichten und verschickten sie in dieser Form kostenlos über Bluetooth. Die Notizfunktion vieler Handy sieht aus wie die bekannten gelben Klebe-Notizzettel *Post-it*. So notierten sich Schülerinnen und Schüler z. B. ihre Mathematik-Hausaufgaben mit der Notizfunktion auf dem Handy und leiteten sie auch an Mitschüler/innen weiter. Im Deutschunterricht der ersten Klasse fanden SMS, MMS und Notizfunktion keine Verwendung.

**Eckpunkt 3.6: Zugang zum Internet mit dessen spezifischer Kommunikation und dessen Informations- und Medienarchiven sowie zu anderen Schnittstellen wie dem interaktiven Whiteboard**

In Episode 5 des Mathematikunterrichts im Gymnasium liessen sich die Kugelkoordinaten der Erde nur mit Hilfe der Konvergenz von Handy und Internet auf dem Schulhof erkunden. Im Grundschulunterricht der 1. Klasse wurde der Zugang zum Internet nicht eingesetzt. Dafür waren zwei Gründe massgeblich. Zum einen hatten die Grundschulinder keine internetfähigen Handys, zum anderen fehlte den Erstklässlern/-innen die notwendige technische und kritische Internetkompetenz. In einer Hauptschule in einer der anderen hier nicht vorgestellten Unterrichtseinheiten von *MyMobile – Handy im Unterricht* gab es einen speziellen WLAN-Zugang für die Handys.

Im Mathematikunterricht des Gymnasiums reduzierte sich der Trend zum medienkonvergenten Handy auf das interaktive Whiteboard im Klassenzimmer. Der Lehrer nutzte das interaktive Whiteboard in jeder Unterrichtsstunde. Für die Episoden situiereten Lernens war der Einsatz des interaktiven Whiteboard wesentlich für:

- Sichten und Vermessen von Winkeln (Episode 3),
- Nutzen von Google Earth für das Erarbeiten der Kugel.-Koordinaten (Episode 4),
- Vermessen von Winkel in unterschiedlichen Perspektiven (Episode 6),
- Sammeln von mathematischen Regeln (Episoden 1 und 2) und gemeinsames Anschauen von Videos (Episode 5).

Die Schüler/innen verwenden im Unterricht oder bei der Hausaufgabe die Fotofunktion des Handys. Das dabei entstandene Bildmaterial präsentieren sie in der Klasse auf dem interaktiven Whiteboard.

#### **4 Operationalisierung des mobilen Lernens an Regelschulen: eine zusammenfassende Bewertung**

Bei der Operationalisierung des mobilen Lernens geht es sowohl um eine didaktische Systematik also auch um deren praktische Anwendung für Lehrerinnen und Lehrer in der Alltagsroutine der Regelschule. Mittel der Operationalisierung waren die beiden Listen von *Eckpunkten* der Planung und Analyse des mobilen Lernens, und zwar die *Eckpunkte Didaktik* und die *Eckpunkte Handy-Anwendungen*. Obwohl die beiden hier vorgestellten Unterrichtseinheiten sehr unterschiedlich waren, sowohl in Bezug auf Altersgruppe und Schultyp (erste Klasse Grundschule; zweite Klasse im Gymnasium) als auch für die didaktische Praxis in beiden Schulen (Stationen-Lernen; vor allem angeleiteter Frontalunterricht), funktionierten die *Eckpunkte Didaktik* und *Handy-Anwendungen* erfolgreich als Hilfsmittel für die Verständigung mit Lehrerin und Lehrer bei der Planung des Handy-Einsatzes. Am Ende der Unterrichtseinheit gaben Lehrerin und Lehrer sowie die Schülerinnen / Schüler ihre Einschätzung des Handy-Einsatzes ab.

Wo liegen die Grenzen dieses Vorgehens? Das didaktische Design, Episoden situierten Lernens mit dem Handy in den lehrergeleiteten Unterricht einzufügen, akzeptiert die Art, wie Schule Lernen und Lehren organisiert. Die didaktische Grundüberlegung richtet sich auf die Assimilation des vertrauten Mediums Handy oder das Handy als Alltagsinstruments in den bekannten und von einer Lehrerin oder einem Lehrer geleiteten Unterricht. Die Episoden situierten Lernens liefern die Möglichkeit, den Prozess der didaktischen Assimilation zu bewerkstelligen. Bei diesem didaktischen Design mit dem eindeutigen Vorrang für den bekannten Schulunterricht, sind dann alltagstypische Formen des Lernens, insbesondere beiläufiges und informelles Lernen, eher institutionell benachteiligt. Deswegen fiel es bei den Unterrichtseinheiten auch schwer, Formen des informellen Lernens zu entdecken. Informelles, beiläufiges, unauffälliges Lernen ist jedoch mit dem Alltagsinstrument Handy verbunden, so die These, weil auch der Alltag von Lernen durchdrungen ist. Um bei dem didaktischen Assimilations-Design schuluntypische Lernformen zu entdecken, war eine systematische Auswertung der Unterrichtseinheiten notwendig, bei der das Team der Medienpädagogen/-innen und Medienpädagoginnen/-innen mit Hilfe der *Eckpunkte* auch die nicht offensichtlichen Ereignisse des Unterrichts diskutierten. Die Beschränkung der Diskussion auf das Medienpädagogik-Team ist dem Praxisdruck und den begrenzten Personalressourcen von Schule geschuldet. In den Unterrichtseinheiten gab es Team-Unterricht, sodass die Klassenlehrerinnen und Klassenlehrer keinen wesentlichen zusätzlichen Vor- oder Nachbereitungsaufwand treiben mussten. Der Team-Unterricht war jedoch nicht formalisiert worden, sondern folgte Ad-hoc-Absprachen, was mit einer Ausnahme, die beteiligten Lehrer/innen und Medienpädagogen/-innen bzw. den männlichen Kollegen auch als erfolgreich bewerteten.



Mit Hilfe der im ersten Teil skizzierten *didaktischen Parameter* lassen sich die Unterrichtseinheiten auch knapp allgemein bewerten. Charakteristisch für beide Unterrichtseinheiten war, das Handy als Alltagsinstrument der Schülerinnen und Schüler in den Regelunterricht einzubinden. Regelunterricht ist eine Lehr- und Lernform, bei der ein Lehrer bzw. Lehrerin die Kinder anleitet (Parameter 1), in dem sich die Schülerinnen und Schüler den Lerngegenstand vor allem reproduzierend und mimetisch aneignen (Parameter 2). Massgeblich ist dabei der Lehrplan (Parameter 3). Medien tauchen vor allem als eigenständige, diskrete Einheit wie das Schulbuch auf (Parameter 4). Der Regelunterricht ordnet sich als vor allem den linksseitigen Polen der Parameter zu. Das situierte Lernen lieferte in beiden Unterrichtseinheiten der Regelschule die Chance, den jeweiligen Gegenpol des entsprechenden Parameters in die Schule hereinzunehmen. Das Model für den Gymnasialunterricht lieferte das Bild der *Lern-Strasse*, auf der der Lehrer das Lernen anleitet. Dabei liegen, wie für die Regelschule typisch, die Schwerpunkte der vier Parameter bei den Polen *Schulpraxis*, *Schulcurriculum*, *Reproduktion des Lerngegenstandes* und der *isoliert linearen Mediennutzung*. Die in diese *Lern-Strassen* eingestreuten *Lern-Plätze* oder *Lernepisoden* des situieren Lernens helfen dann jedoch die Gegenpole der vier Parameter zu realisieren.

Im Grundschulunterricht war die Idee des situierten Lernens in der Form des *Stationen-Lernens* als massgeblicher Teil der Lehr- und Lernpraxis vorhanden. Das Handy als eine *Lern-Station* neben mehreren anderen öffnete den Unterricht jedoch für die Pole *Alltag* (Parameter 1), *subjektive Rekonstruktion* (Parameter 2), *subjektive Kompetenz von Schülern als naive Experten* (Parameter 3). In der Unterrichtseinheit liessen sich die Grundschülerinnen auf ihren Sprachalltag ein und gingen im Schulumfeld und zu Hause mit den Eltern auf die Suche nach Wörtern und Lauten. Die Rekonstruktion ihres Sprechens im Kontext der Familiensprache bekommt mit dem Handy den Charakter des Normalen.

Im Mathematikunterricht des Gymnasiums sind *Alltag*, *subjektive Rekonstruktion*, *subjektive Kompetenz von Schülern/-innen als naive Experten/-innen* eher ebenso randständig wie das situierte Lernen, das diese Pole zu realisieren hilft. In einem Unterricht mit einer deutlichen traditionellen Ausprägung in Bezug auf die Parameter bekam das Handy die wichtige didaktische Funktion, *Lern-Episoden* zu ermöglichen. Dazu bot sich vor allem das Handy als Hausaufgabe an. Trotzdem braucht es zusätzliche Beratung des Lehrers und Unterstützung der Schülerinnen und Schüler, um die subjektive Rekonstruktion z. B. von Winkel im eigenen Wohnumfeld mit Pop-Musik auch mit den die Forderungen des Lehrplans zu verbinden. Die Handy-Funktion, mit der man sich ins digitale geographische Kartennetzwerk einklinken kann, war dagegen einfach zu realisieren. Hier ist der Bezug zum Lerngegenstand ähnlich offensichtlich wie bei der Verzerrung von Winkel beim Fotografieren. Mit einer deutlichen Nähe zum Lerngegenstand öffnen sich dann auch Verbindungen zwischen der Fotofunktion des Handys und den typischen mathe-

matischen Repräsentationsmitteln wie dem Modell einer Pyramide aus stabilem Material. Das Handy zusammen mit der digitalen Tafel, dem Whiteboard, bietet sich im Moment als vorrangige Form der Medienkonvergenz in der Schule an. Diese Konvergenz mit dem Whiteboard trägt deutlich dazu bei, mit dem Handy Formen des situierten Lernens zu realisieren. Das Handy im Kontext des situieren Lernens erhöht die Möglichkeit, *Alltag* (Parameter 1), *subjektive Rekonstruktion* (Parameter 2) und die *subjektiven Kompetenzen* der Schülerinnen und Schüler (Parameter 3) in den Unterricht zu integrieren.

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# Lerner/innen-zentrierter Unterricht mit Netbooks

## Drei Fallbeispiele von mobilem Lernen in Schweizer Schulen

Christoph Pimmer und Urs Gröhbiel

### Abstract

*Im Rahmen der vorliegenden Studie sind drei innovative, Netbook-gestützte Pilotprojekte mit Lernenden aus Kindergarten, Primarschule und einer Kleinklasse realisiert und systematisch untersucht worden. Schulkinder haben die Mobilgeräte u. a. zu Recherchen in einer Projektwoche zur Erarbeitung einer Zeitung sowie zur Umsetzung der Methode «Lernen durch Lehren» mit Kindergartenkindern eingesetzt. Wir zeigen mit diesem Beitrag auf, wie Netbooks in offen-strukturierten Lernumgebungen soziale, kooperative Lernpraktiken, kontextübergreifendes Lernen sowie multimedial-gestaltende Unterrichtsformen ermöglicht oder unterstützt haben. In der Untersuchung wird insbesondere die Eignung und motivationale Wirkung der Methode «Lernen durch Lehren» im Rahmen eines Netbookeinsatzes deutlich. Die überwiegend lerner/innen-zentrierten Aktivitäten konnten durch Funktionalitäten des Netbooks gut unterstützt werden und haben zu einer grossen Akzeptanz, zu vielfältigen Nutzungsformen und einer hohen Motivation der Lernenden geführt.*

### 1 Netbooks: innovative Lernpotenziale für den Schulunterricht?

Wie kaum eine andere Technologie hat die rasante globale Verbreitung von Mobilgeräten in den letzten Jahren zu einer Veränderung vieler Bereiche der heutigen (Wissens-)Gesellschaft geführt. Die Tragweite dieses Phänomens wird beispielsweise an der Zahl der weltweiten Mobilgeräteabonnements deutlich, die dieses Jahr noch die Schwelle von fünf Milliarden übersteigen wird (ITU Press Release, 2010). Um Mobiltechnologien haben sich vielfältige soziale Praktiken etabliert, die sich auf Bereiche wie Politik, Sicherheit und Frieden, Finanzen oder Gesundheit auswirken (vgl. z. B. Somaiya, 2010). Neben der Erforschung der Einsatzmöglichkeiten von Mobilgeräten im Bereich des beruflichen Lernens (vgl. z. B. Pachler, Pimmer & Seipold, 2011; Pimmer, Nissler & Gröhbiel, 2010) und im Kontext des lebenslangen Lernens (vgl. z. B. Sharples, 2000) wird auch der Einfluss portabler Computertechnologien im Bereich der schulischen Bildung untersucht. Zum Beispiel beschäftigen sich Forschende im Bereich des mobilen Lernens bisher vorwiegend mit den Wirkungen von kleineren Mobilgeräten wie PDAs, Mobiltelefonen oder

Smartphones auf schulisches Lernen. Aber auch im Rahmen von 1:1-Laptopinitiativen werden die Effekte mobiler Computertechnologie auf schulisches Lernen systematisch analysiert. In der Literatur sind dazu – mit Vorsicht zu betrachtende – Aussagen zu positiven Wirkungen der Technologie auf die Fertigkeiten der Lernenden z.B. in der Handhabung von Textverarbeitungsprogrammen und auf deren Schreibkenntnisse zu finden. Für eine Forschungssynthese von 1:1-Laptopinitiativen siehe z.B. Penuel (2006).

Neuere Entwicklungen vereinen unter dem Begriff «Netbooks» wesentliche technische und funktionale Charakteristika von Mobiltelefonen und Laptops und bieten dadurch aus Lernperspektive interessante Einsatzmöglichkeiten im schulischen Kontext: Die Grösse und das geringe Gewicht erlauben den Lernenden eine hohe räumliche Mobilität. Der Zugang zum Internet und die damit verbundenen Kommunikationsfunktionen ermöglichen eine Reihe von sozialen Interaktionsmöglichkeiten, vom Chat über Internettelefonie und Videokonferenzen bis hin zu asynchronen Austauschforen und der gemeinsamen Bearbeitung von Online-Dokumenten durch mehrere Teilnehmer. Ähnlich wie viele Mobiltelefone verfügen auch Netbooks über die Möglichkeiten einer multimedialen Aufnahme per Bild und Video z.B. für die Dokumentation von Lerner/innenlebnissen. Navigations- und Interaktionsfunktionen können – ebenfalls vergleichbar zu heute handelsüblichen Smartphones oder Computer-Pads – via Touchscreen wahrgenommen werden. Darüber hinaus bieten Netbooks durch ihr – im Vergleich zu Smartphones – grösseres Display und die integrierte Tastatur weitere Möglichkeiten zur (kreativen) Informationseingabe und -verarbeitung wie z. B. die Bedienung von Zeichen- oder Schreibprogrammen.

In der vorliegenden Studie wurden drei Fallbeispiele innovativer Piloteinsätze von Netbooks in der Schweiz im Kontext des schulischen Lernens realisiert und systematisch untersucht. In den nächsten Abschnitten werden wir zunächst die drei Lernprojekte, den Kontext und die Untersuchungsmethodik kurz beschreiben. Anschliessend stellen wir wichtige Themen und Ergebnisse unserer Datenanalyse vor. Im letzten Teil der Publikation diskutieren wir die Erkenntnisse im Kontext der bestehenden Forschungsliteratur.

## **2 Ablauf und Untersuchungsgegenstand: Drei Netbookpilotprojekte**

Die vorliegende Studie stützt sich auf der Untersuchung von drei Netbook-basierten Lernprojekten. Die Projekte haben Wissenschaftler/innen vom Schweizerischen Netzwerk für Bildungsinnovation initiiert, begleitet und systematisch evaluiert. Die Studie wurde massgeblich durch eine Softwarefirma finanziert. Ein weiteres IT-Unternehmen stellte die Netbooks sowie den Support bereit und eine Telekommunikationsgesellschaft ermöglichte zudem den Internetzugang, sodass den Schülern/-innen für Hard- und Software sowie Internetanbindung keine Kosten entstanden.

Die Studie wurde gemäss den folgenden Schritten umgesetzt:

1. Definition der Leitfragen und des Forschungsfeldes
2. Selektion der Fallbeispiele (Lernprojekte)
3. Ausarbeitung des Grobkonzepts durch die Projektleitung
4. Rückfragen u. Ergänzungen durch begleitende Expert/innen
5. Ausarbeitung der Feinkonzeption durch die Projektleitung
6. Experteninterviews: Rückmeldungen zur Feinkonzeption von Expert/innen mit Forschungs- und Projekterfahrung bez. mobilem Lernen
7. Diskussion der Expert/innenrückmeldungen im Kick-off Workshop und Überarbeitung und Spezifizierung der Feinkonzeption
8. Umsetzung der Lernprojekte
9. Datensammlung und Datenanalyse im Feld
10. Identifikation zentraler Themen und Konstrukte
11. Analyse und Interpretation der Ergebnisse im Kontext der Forschungsliteratur

### **Selektion der Pilotprojekte**

Das Schweizerische Netzwerk für Bildungsinnovation hat insgesamt 16 Bildungsverantwortliche aus dem schulischen und privaten Bildungsbereich eingeladen, Vorschläge für Netbook-gestütztes Lernen einzureichen. Die Eingeladenen haben Erfahrung bei der Nutzung von Informations- und Kommunikationstechnologien durch Kinder. Selektionsanforderungen waren u.a. eine didaktisch reichhaltige Kombination von Funktionen in den Bereichen Wissenserwerb, Kommunikation und Zusammenarbeit, Produktion und «Edutainment» sowie die Übertragbarkeit der Konzepte auf andere Situationen. Die im Folgenden vorgestellten drei Projekte wurden ausgewählt und realisiert:

### **«Calancatal»: Erstellung einer Schüler/innenzeitung im Rahmen einer Projektwoche**

Schülerinnen und Schüler einer Kleinklasse planten und realisierten zusammen mit ihrem Lehrer einen viertägigen Aufenthalt im Calancatal, um sich mit den Menschen und der Natur dieses entlegenen Gebiets auseinanderzusetzen. Ziel der Projektwoche war die Erarbeitung wesentlicher Grundlagen für eine Schüler/innenzeitung. Der Netbookeinsatz bot den Schülern/-innen die Möglichkeit, die Themen direkt vor Ort alleine oder im Team zu bearbeiten. Sie setzten die Netbooks für Internetrecherchen, für das Erstellen und Bearbeiten von Text-, Ton-, Bild und Videomaterial (z. B. Interviews, Fotoaufnahmen), zur Zusammenarbeit oder für die Verwaltung und den Austausch von Daten ein.

### «Ani...Paint»: Fünftklässler/innen unterrichten Kindergartenkinder

Im Pilotprojekt «Ani...Paint» stand die handlungsorientierte Unterrichtsmethode «Lernen durch Lehren» (vgl. Martin 2002) im Vordergrund. Nachdem die Schüler/innen einer fünften Klasse in der Primarschule Davos den Umgang mit dem Multimedia- und Zeichenprogramm Ani...Paint<sup>1</sup> erlernt hatten, vermittelten sie ihre erworbenen Kenntnisse und Fertigkeiten im Kindergarten. An drei Besuchsterminen illustrierten die Kindergartenkinder unter der Anleitung der Schüler/innen ein Märchen mithilfe des Programms.

### «CompiSternli»: Bildbearbeitung im Unterricht und zu Hause

Auch beim Projekt «CompiSternli» erlernten Kinder im Alter von 11 bis 16 Jahren die Bedienung eines einfachen Bildbearbeitungsprogramms auf dem Netbook. Diese Phase enthielt instruktionale, selbstgesteuerte und kooperative Lerneinheiten. Ziel der Aktivitäten war die Weitergabe der erworbenen Fertigkeiten an ältere Personen zu einem späteren Zeitpunkt.<sup>2</sup>

### Netbooks

Die Kinder der drei Pilotprojekte wurden mit je einem robusten, wasserabweisenden Netbook ausgestattet. Das Gerät ist mit einem dreh- und klappbaren Touchscreenmonitor sowie einer schwenkbaren Kamera ausgestattet. Zusätzlich zum integrierten Ethernet-Adapter war der Internetzugang durch einen USB-Stick möglich.



Abbildung 1: Netbookmodell der Pilotprojekte

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1 <http://www.Ani...Paint.com/ap3/index.php>

2 Der Lehreinsatz der Schüler/innen bei den Senior/innen konnte im Rahmen dieser Studie aus zeitlichen Gründen noch nicht berücksichtigt werden.



### 3 Forschungsdesign

#### 3.1 Leitfragen und Forschungsansatz

Die Forschung orientierte sich an zwei Leitfragen:

- *Welche Wirkungen und Effekte eines Netbook-basierten Lernprojekts nehmen die Schülerinnen und Schülern, Lehrkräfte und weitere Bezugspersonen hinsichtlich Lernpraktiken wahr?*
- *Welches sind die wesentlichen Einflussfaktoren auf den Erfolg und Misserfolg des Netbook-Einsatzes bei Kindern?*

Wir haben die Studie gemäss den Prinzipien der Designforschung durchgeführt. «Design Research» versteht die Forschungsgemeinschaft als wissenschaftlich fundierte Planung, Realisierung und Evaluation von pädagogischen Interventionen wie z. B. Programmen, Lernstrategien, Produkten und/oder technischen Lösungen (vgl. z. B. Plomp, 2009). Diese – in der Lehr- und Lernforschung zunehmend beliebtere – Vorgehensweise ist wie kein anderer Ansatz geeignet, «nachhaltige Innovationen im Bildungs- und Unterrichtsalltag hervorzubringen» (Reinmann, 2005). Design Research ist als Forschungsansatz zu sehen, der verschiedene Methoden aus unterschiedlichen Disziplinen heranziehen und integrieren kann. Für ein umfassendes Design Research Framework siehe z. B. Bannan, 2009. Design Research wird insbesondere durch folgende Eigenschaften charakterisiert: Der Ansatz basiert auf der Gestaltung von Interventionen in Bezug auf Frage- und Problemstellungen in realen Bildungskontexten. Er unterstützt das Ziel, diese zu verstehen und iterativ zu verbessern. Designforschung erfordert die Einbindung von und die Zusammenarbeit mit den beteiligten Akteuren/innen (vgl. dazu Plomp, 2009). Aus wissenschaftlicher Perspektive erfolgt das Design unter der Berücksichtigung bestehender Theorien und zielt auf die Entwicklung neuer theoretischer Konstrukte ab. Es wird insbesondere den Fragen nachgegangen, *ob* und *warum* die Interventionen im untersuchten Kontext erfolgreich waren. Dabei liegt der Fokus weniger auf isolierten Variablen (Plomp, 2009) als auf einem holistischen Ansatz, der die Interventionen als Wechselbeziehungen zwischen Methoden, Medien, Materialien, Lehrenden und Lernenden erachtet (vgl. Reinmann, 2005).

#### 3.2 Datenerhebung

Für die Evaluation der drei Pilotprojekte wurden die Lehr- und Betreuungspersonen, Schüler/innen, Eltern, Schulleitung sowie ein IT-Verantwortlicher in Form von semistrukturierten Interviews befragt, die Lerntagebücher der Schüler/innen ausgewertet und in einem Fall eine teilnehmende Beobachtung durchgeführt.

Tabelle 1: Projektspezifische Darstellung der Datenerhebungsgefäße und -methoden

Projekt «Compisternli»	Projekt «Calancatal»	Projekt «Ani...Paint»
Schriftl. Einzel-Interviews mit SchülerInnen (8)* Lerntagebücher (8)	Gruppen-Interviews mit SchülerInnen (12) Lerntagebücher (9)	Gruppen-Interviews mit SchülerInnen (15) Gruppen-Interview mit Kindergartenkindern (4) Lerntagebücher (19)
Einzel-Interview mit Lehrperson (1)	Einzel-Interviews mit Lehr- und Betreuungspersonen (2) Einzel-Interview mit Schulleiterin (1) Einzel-Interview mit Informatikverantwortlichem (1)	Gruppen-Interview mit Lehr- und Betreuungspersonen (2) Gruppen-Interview mit KindergärtnerInnen (3)
Einzel-Interviews mit Eltern (3)		

\* Anzahl der befragten Personen

### 3.3 Datenanalyse

Zentrale Aussagen und Statements aus den Lerntagebüchern und Interviews wurden aufgegriffen und schriftlich zusammengefasst. Auf dieser Basis haben drei Forschende eine kritisch-reflektive Analyse und Interpretation der Daten vorgenommen, die weitgehend induktiver Natur war. Unabhängig von einander leiteten sie wesentliche Erkenntnisse aus dem vorliegenden Datenmaterial ab. Sie haben dabei jene Aussagen berücksichtigt, die entweder von der breiten Mehrheit der Projektbeteiligten genannt oder von vereinzelt Gruppen oder Personen als äusserst wichtig erachtet worden sind. Im darauffolgenden Konsensfindungsprozess haben die Forschenden ihre Einschätzungen systematisch besprochen. Sie haben unterschiedliche Wahrnehmungen diskutiert und die wesentlichen Aspekte der gemeinsam getragenen Erkenntnisse herausgearbeitet.

### 3.4 Geltungsbereich, Einschränkungen und Forschungsqualität

Allgemein müssen wir an dieser Stelle festhalten, dass wir mit den drei realisierten Pilotprojekten nur einen kleinen Teil möglicher schulischer Netbook-basierter Lernszenarien untersuchen konnten. Wir können uns zahlreiche weitere Einsatzbeispiele im schulischen Kontext vorstellen, die zum Teil auch bereits in anderen Projekten realisiert worden sind. Zudem muss berücksichtigt werden, dass auch die spezifischen Ausprägungen der Fallbeispiele eine breite Generalisierung der Erkenntnisse erschweren. Insbesondere folgende Faktoren beeinflussen die externe Validität der Studie: (1) Die geringe Anzahl der Projekte (n=3); (2) Der Wettbewerbscharakter bei der Projektvergabe, der kreative Anwendungsformen sowie medienaffine Lehrkräfte und Lernende begünstigte; (3) Der begrenzte Evaluations-

zeitraum, der die Identifikation von Langzeiteffekten verunmöglichte; (4) Die geringen Schüler/innenzahlen in den Projekten, die ebenfalls zu einer Verzerrung führen können. Allerdings zielen wir mit dieser Studie weniger auf die numerische Generalisierbarkeit als auf die tiefere Analyse der Spezifika des Forschungsgegenstandes ab. Die Ergebnisse zeigen, wie unter guten Voraussetzungen Pionierarbeit mit Netbooks geleistet werden kann. Zudem ermöglichte uns der Vergleich der Fälle die Identifikation von übergreifenden Mustern, die über den eigentlichen Untersuchungsgegenstand hinaus wertvolle Hinweise liefern können. Eine entsprechende Qualität der Forschungsarbeiten wird durch die systematische Auswertung der Datenquellen sowie durch die Forschendentriangulation gewährleistet: Die Involvierung dreier Forscher/innen in den Konsensfindungsprozess der Dateninterpretationen erlaubt eine fundierte Abstützung der erarbeiteten Themen. Das gewählte Forschungsdesign ist allerdings nicht geeignet Kontext und Phänomen (Netbooknutzung) zu trennen resp. die exakte Wirkung der einzelnen Faktoren zu determinieren: Spezifische Implikationen von Technologie, didaktischer Methode oder weiterer (kontextueller) Faktoren können im Rahmen dieser Studie nicht erhoben werden. Diese rein analytische Trennung ist hier weder möglich noch sinnvoll. Der Netbookeinsatz ist als ein Element eines umfassenden Lernarrangements zu sehen und zu evaluieren; der Technologie per se können in dieser Studie nur sehr eingeschränkt Wirkungen zugeschrieben werden.

#### **4 Ergebnisse**

Im Rahmen dieser Publikation können wir nur eine selektive Auswahl der Erkenntnisse darstellen und diskutieren. In Anlehnung an die fachliche Ausrichtung der Zeitschrift werden wir vor allem die – aus (medien-)pädagogischer Sicht – interessanten Themen erörtern<sup>3</sup>.

##### **4.1 *Offen-strukturierter, lerner/innen-zentrierter Unterricht: kreativer Gestaltungsspielraum in klaren Strukturen***

Bei der Analyse wurde deutlich, dass sich Netbooks für die Unterstützung eines offen-strukturierten, lernerzentrierten Unterrichts wie z.B. des projekt-basierten Lernens (vgl. z.B. Frey, 1995) eignen und freies exploratives Lernen fördern. Die Rolle der Lehrenden war dabei weitgehend auf das Vorgeben von – mehr oder weniger strukturierten – Aufgabenstellungen und Rahmenbedingungen sowie Coaching- und Mentoringaufgaben fokussiert. Die Schüler/innen bearbeiteten z. B. im Rahmen der Projektwoche im Calancatal Aufgaben wie die Erstellung von zwölf Interviewfragen und die Befragung von vier Interviewpersonen unterschiedlichen Alters. Daneben erhielten sie auch weitgehend unstrukturierte Aufträge, wie beispielsweise Naturbeobachtung und -dokumentation mit dem Netbook. Über

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<sup>3</sup> Ein umfassender Forschungsbericht mit weiteren pädagogischen, organisationalen und technischen Faktoren kann unter [www.snbi.ch](http://www.snbi.ch) angefordert werden.

alle drei Projekte hinweg wurden den Lernenden viele Freiräume gewährt. Die hohen Freiheitsgrade sowie die kreative Vorgehensweise fanden grossen Anklang, wie eine Schülerin zum Ausdruck brachte: *«Am besten gefallen hat mir, dass wir [...] sehr kreativ und frei arbeiten durften»* (Schülerin Compisternli).

Zusätzlich zu der Bearbeitung der offen-strukturierten Aufgabenstellungen erkundeten die Lernenden – auch ohne Stimuli und Anleitung der Lehrenden – die Funktionalitäten der neuen Geräte z. B. die Informationsrecherche im Internet, ein Textverarbeitungsprogramm zur Verbesserung der Rechtschreibkenntnisse oder eine Sprachausgabefunktion: *«Wir haben auch noch ausprobiert, dass der Computer für uns spricht, z. B. eine ganz tiefe oder ganz hohe Stimme»* (Schüler, Ani...Paint). Dabei haben die Schüler/innen neue kreative Lernpraktiken generiert: Sie haben z. B. auf eigene Initiative hin herausgefunden, dass sie ein Diktat simulieren können, indem sie sich mit dem Netbook beim Lesen selbst aufnehmen und danach die Aufnahme zum Üben abspielen können. Das Zeichenprogramm Ani...Paint regte insbesondere die Kindergartenkinder zum explorativen Lernen an, wie eine Kindergärtnerin berichtete: *«Was ich toll fand: Man kann es wieder wegradieren, das geht sonst nicht so einfach, [...]»* *«Die Kinder haben viel einfach ausprobiert, [...] wenn es nicht so wird, wie man möchte, dann weg damit»* (Kindergärtnerin, Ani...Paint). Auch die Schüler/innen berichteten vom Entdeckungsdrang der Kindergartenkinder: *«Es macht (ihnen) einfach Spass zu schauen, wo einzelne Funktionen sind»* (Daniel, CompiSternli).

Trotz der relativ offenen Lernmethoden und -formen bedurfte es klarer Strukturierungsmassnahmen im Umgang mit den Geräten wie z. B. ein Verbot die Netbooks auf dem Pausenhof zu benutzen und damit andere Mitschüler/innen zu filmen. Die Nutzung des Internets im Klassenzimmer war nur bei ausdrücklicher Genehmigung der Lehrkräfte erlaubt.

#### **4.2 Unterstützung und Förderung sozialer, kooperativer Lernpraktiken**

Gemeinsames Merkmal der Projekte war, dass der Umgang mit den Netbooks kein Lernziel per se darstellte, sondern Voraussetzung und Mittel war, um soziale Ziele zu erreichen: z. B. anhand von Aufgaben wie das gemeinsame Erstellen einer Schüler/innenzeitung – oder die Auseinandersetzung der Schüler/innen mit älteren Personen oder Kindergartenkindern: *«Vor allem das soziale Lernen im Kindergarten, das war das höchste Ziel»* (Lehrer, Ani...Paint). Dementsprechend wurde der bewegendste Moment als jener wahrgenommen, als der *«Bub [...] dem Kleinen die Geschichte erzählt hat, [...] daran konntest du sehen, dass du über Technik soziale Ziele erreichen kannst»* (Lehrer, Ani...Paint). Angestrebt haben die Lehrer/innen auch die bessere Integration neuer Schülerinnen und Schüler in die Klassengemeinschaft. Dies *«hat absolut ins Schwarze getroffen. [...] durch gemeinschaftliche Aktivitäten konnte der Klassenzusammenhalt gestärkt werden»* (Lehrer, Ani...Paint).

Neben der intensiven Zusammenarbeit der Kinder bei kollaborativen Aufgabenstellungen hat sich gezeigt, dass die Schüler/innen rasch dazu übergegangen sind, sich bei Fragen hinsichtlich der Netbooknutzung gegenseitig zu unterstützen. Beispielsweise beobachtete der Lehrer der Projektgruppe in der abendlichen Redaktionssitzung wie die Schüler/innen spontan «ihr Wissen an die Mitschüler weitergegeben haben» (Lehrer, Calancatal). Die Lehrenden und Projektverantwortlichen haben wiederholt beobachtet, dass die gemeinschaftliche Arbeit mit den Netbooks bei den Schüler/innen zahlreiche kleine Erfolgserlebnisse auslöste, die sich positiv auf das Selbstwertgefühl und das Selbstbewusstsein auswirkten. Die Schüler/innen «mussten einander helfen [...] sie wurden positiv bestärkt» (Lehrer, Ani...Paint). Das Netbook diente dabei als Brücke für die Interaktion der Lernenden, wie die Lehrkraft ergänzte: «Bei der gemeinsamen Handhabung des Geräts wird der Kontakt hergestellt.»



Abbildung 2: «Lernen durch Lehren» im Kindergarten

In den Projekten Ani...Paint und CompiSternli zeigte sich, dass durch den Einsatz von Netbooks eine Spezialform des kooperativen Lernens, das «Lernen durch Lehren» (vgl. z.B. Martin & Kelchner, 1998) gut unterstützt werden konnte. Schüler/innen und Kindergartenkinder empfanden diese Methode gleichsam sehr positiv. Die meisten Schüler/innen gaben in den Interviews oder in den Lerntagebüchern an, dass sie auf einen weiteren Einsatz als Lehrende hoffen:

«Ich fand es mega-cool und lustig. [...] Ich hätte nie gedacht, dass es so toll werden wird» (Schüler, Ani...Paint), «Im Kindergarten war es schön. [...] Ich habe es lustig gefunden.» Die Begleitpersonen haben beobachtet, dass die Schüler/innen die Kindergartenkinder aufmerksam betreut haben, indem sie Unsicherheiten der Jüngeren adressierten und diese situativ unterstützten: Die «Fünftklässler haben

sich gut auf die Kindergartenkinder eingelassen». [...] «Probleme wurden von Primarschülern gut aufgefangen, sie haben sofort geholfen» (Kindergärtnerin, Ani... Paint). Auch die Kindergartenkinder waren von dem dyadischen, Netbook-gestützten Einsatz überzeugt, wie eine Kindergartenbetreuerin anmerkt. Sie «haben es sehr genossen, die Zweierteams blieben zusammen, und unsere Kinder waren sehr begeistert».

Der Erfolg des Projekts wurde von den Betreuenden massgeblich in der Wirkung dieser Methode gesehen, d.h. in der Zielsetzung, später eine weitere Person in der Handhabung des Programmes zu unterrichten. Diese Aufgabestellung hat die Motivation und somit auch die intensive Auseinandersetzung mit dem Gegenstand stark gefördert, wie die Projektleiterin von Ani...Paint berichtete: «Da will ich auch den Kreis grösser machen, es geht nicht ums Netbook, sondern um den Auftrag den die Kinder wahrnehmen müssen, nachher Schule geben zu müssen. Und dort ist die Motivation gross gewesen, damit man selbst bestehen kann. Durch das war die Motivation gegeben, es (das Programm) wirklich gut kennenzulernen und im Griff zu haben.»

Ein weiterer wesentlicher Aspekt war für die Kindergärtner/innen die direkte Begleitung durch die Schüler/innen in der dyadischen Formation. Die «Eins zu eins Betreuung war sehr wichtig [...] das war schon sehr, sehr wichtig dass es so reibungslos gelaufen ist.» Oder, wie ein anderer (Kindergartenbetreuer) ergänzt: «Die Kinder nehmen es von Kindern ganz anders entgegen als wenn wir etwas zeigen ... auf dieser Ebene ist es näher.»

#### **4.3 Kontextübergreifendes Lernen über das Klassenzimmer hinaus**

In den Interviews betonten die Schüler/innen die Eignung der Netbooks für eine Nutzung über die klassischen Schulgrenzen hinaus in neuen Lern- und Erlebniswelten, die durch die Portabilität und Grösse ermöglicht wurde: «Man ist flexibel. Man kann überall mit dem Gerät arbeiten. Man ist nirgends angebunden» (Schüler, Calancatal). «Wir mussten nicht immer am gleichen Ort bleiben» (Schüler, Calancatal). «... und dass man es wie ein Täschchen tragen kann» (Schülerin, Ani... Paint) «... oder wie einen Aktenkoffer» (Schüler, Ani...Paint). Diese Aussagen weisen auf das Potenzial der Netbooks hin, Lernen in unterschiedlichen Kontexten zu ermöglichen und verschiedene Lernsituationen miteinander zu verbinden. Lernerfahrungen wurden mithilfe der Netbooks in weitere schulische und ausserschulische Lernsituationen und wieder zurück übertragen, wie das Beispiel Calancatal anschaulich vor Augen führt: Nachdem Schüler den Umgang mit den Netbooks im Klassenzimmer erlernt haben, dokumentierten sie situativ Beobachtungen, Aussagen und Eindrücke im Rahmen einer Projektwoche (z. B. durch Interviews). Zusätzlich recherchierten sie Informationen im Internet. Zurück in der Klasse verarbeiteten die Lernenden die gewonnenen Erfahrungen und Eindrücke im Rahmen einer Schüler/innenzeitung (siehe Abbildung 3).



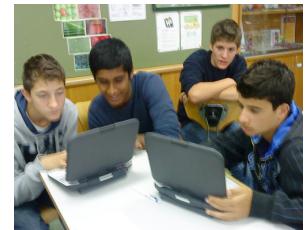
Erste Schritte im Klassenzimmer



Netbooknutzung in der Seilbahn



Interview mit einem Ziegenbauer



Zusammenstellung der Informationen für die SchülerInnenzeitung

Abbildung 3: Lernen durch verschiedene Kontexte hinweg (Calancatal)

Auch in den anderen Projekten wurde Lernen durch verschiedene Kontexte hinweg gefördert: Die Schüler/innen erwarben im Rahmen des Unterrichts im Klassenzimmer Fertigkeiten in der Handhabung eines Zeichenprogramms, die sie zu einem späteren Zeitpunkt ausserhalb der Schule an andere Zielgruppen (z. B. an Kindergartenkinder) weitergaben.



Abbildung 4: Lernen im Förderzimmer

Auch innerhalb der Schule hat die Grösse der Netbooks Lernen in bis dahin ungenutzten Räumlichkeiten ermöglicht, wie die Projektverantwortliche von Ani... Paint beschreibt: «Cool ist [...], wir sind ins Lernzimmer gegangen, ins Förderzimmer, da kannst du dich irgendwo hinsetzen, auf das Sofa oder so und die Kinder haben das Gerät vor sich, und das würde mit einem normalen Notebook nicht gehen [...]. Klein und handlich, die können wirklich irgendwo damit arbeiten.» Darüber hinaus verwendeten die Schüler/innen die Geräte in zwei der Fallbeispiele auch privat. Dabei standen Aktivitäten im Internet, insbesondere synchrone und asynchrone Kommunikationsaktivitäten im Vordergrund, wie die Aussagen der Compisternli Schüler/innen verdeutlichen:

«Internetrecherchen, Schularbeiten, CompiSternli-Aufgaben, Chatten, Facebook, E-Mail-Kontakte» (Schülerin, CompiSternli). «Ich war im Paint, war am Skypen und im Internet am Surfen» (Schüler, CompiSternli). Schüler/innen, denen diese Möglichkeit in einem anderen Pilotprojekt verwehrt war, äusserten explizit den Wunsch nach einer Nutzung der Geräte im privaten Kontext. Sie gaben folgende Wünsche hinsichtlich der zukünftigen Verwendung an: «... das Gerät mit nach Hause nehmen dürfen» (Schüler, Ani...Paint) oder «es gerne mit in die Ferien nehmen» (Schüler, Ani...Paint).

#### 4.4 Gestaltendes Lernen durch Multimedia

Ein weiteres interessantes Thema waren neue Gestaltungsmöglichkeiten, die die Lernenden durch die multimedialen Funktionen des Netbooks wahrnehmen konnten: Diese umfassten Möglichkeiten der Ton-, Bild- und Videoaufnahme und der Bearbeitung und Anreicherung dieser Materialien via Touchscreen (Siehe z. B. Abbildung 5). Die Kinder haben die integrierten und flexiblen Aufnahmefunktionen geschätzt: Einzelne Schüler/innen gaben z. B. an, Tonaufnahmen mithilfe des Netbooks gemacht zu haben: «Ich habe dem Kindergartenkind gezeigt, wie man Ton aufnimmt» (Schüler, Ani...Paint). Andere hoben die Möglichkeiten der integrierten Kamera positiv hervor: «Ich fand es toll, dass man mit dem Netbook Bilder machen konnte und nicht extra eine Kamera mitnehmen musste» (Schüler, Calancatal). «So lustig ist, dass man die Kamera verstellen kann» (Schülerin, CompiSternli).

Bei der Bildbearbeitung waren die Kinder durch die Möglichkeiten des Touchscreens beeindruckt, wie z. B. die Projektleiterin von Ani...Paint zum Ausdruck brachte: «Das Netbook hat grosse Faszination ausgeübt, das mit dem Touchscreen, darauf zeichnen, das ist sehr speziell». Auch die Kinder schätzten diese gestalterischen Möglichkeiten: «dass man mit dem Finger oder mit einem Schreiber malen konnte» (Schüler, Ani...Paint). «Sie sind klasse: Touchbildschirm, Stift, drehbarer Bildschirm usw.» (Schülerin, CompiSternli).



Abbildung 5, Aufgabe: Erstelle ein Bild von dir und bearbeite dies.



Bei der Begeisterung der Kinder im Hinblick auf die gestalterischen Möglichkeiten mit dem Netbook müssen wir anmerken, dass wir im Rahmen dieser Studie keine Langzeitwirkungen evaluieren konnten. Es bleibt unklar, wie nachhaltig diese motivationalen Effekte sind.

#### **4.5 Akzeptanz, Besitznahme und Motivation**

Über die drei Projekte hinweg konnten eine hohe Akzeptanz und ein selbstverständlicher Umgang der Lernenden mit den Geräten beobachtet werden. Die Schüler/innen als auch die Kindergartenkinder hatten kaum Berührungängste in der Handhabung der Netbooks. Sie haben den Umgang mit neuen Geräten und Programmen rasch erlernt, wie das Zitat eines Lehrers veranschaulicht: *«... mir ist aufgefallen, wie schnell die das kapiert haben [...] Sie (die Kinder) sind schon schnell beim Lernen solcher Sachen»* (Lehrer, Ani...Paint). Auch von Elternseite wurde diese Beobachtung getätigt: Das *«hat er sehr schnell im Griff gehabt»* (Eltern Compisternli). Obwohl alle Kinder mit den Netbooks gut umgehen konnten, haben Lehrpersonen im individuellen Nutzungsverhalten der Schüler/innen grosse Unterschiede beobachtet.

Ein weiteres interessantes Ergebnis ist in diesem Zusammenhang die Besitznahme und Anpassung der Geräte an die eigenen Bedürfnisse und Vorstellungen, die sich z. B. in den Konfigurationseinstellungen manifestierten. So berichteten die Kinder sie hätten z. B. *«den Hintergrund geändert, Minianwendungen wie z. B. Uhr, Datum und Notizblock auf den Desktop gepflanzt»* (Schülerin, CompiSternli).

Insgesamt haben die Netbook-basierten Lernprojekte überwiegend zu einer hohen Motivation der Lernenden geführt. Die Begeisterung und Freude der Lernenden war über die drei Projekte hinweg zu beobachten und wurde von allen Beteiligtegruppen explizit zum Ausdruck gebracht. Sie manifestierte sich z. B. in Aussagen wie *«Ich würde sofort wieder teilnehmen und die Netbooks wieder mitnehmen»* (Schülerin, Calancatal) oder *«Ich habe das Projekt Ani...Paint mega-cool gefunden. Ich möchte so etwas noch mal machen»* (Schüler, Ani...Paint). Auch die befragten Betreuungspersonen berichteten von der Freude und Motivation der Kinder: *«Unsere Kinder waren sehr begeistert, begeistert von den Schülern und von den Computern»* (Kindergartenbetreuerin, Ani...Paint); und auch von Elternseite wurde diese Beobachtung getätigt: *«Meine Tochter hat das sehr motiviert und cool gefunden»* (Mutter, Compisternli).

### **5 Diskussion der Themen im Kontext der Forschungsliteratur**

Die Analyse der Ergebnisse erlaubt Interpretations- und Deutungsmöglichkeiten unterschiedlicher Natur. Zunächst zeigen wir, wie einige der identifizierten Themen unserer Untersuchung bereits in der Forschungsliteratur beschrieben werden. Anschliessend diskutieren wir die Möglichkeiten einer breitflächigeren Realisierung innovativer, Netbook-gestützter Lernformen vor dem Hintergrund heutiger Schul-

praktiken. Zuletzt werden wir die Erkenntnisse aus der Studie im Forschungsgebiet des *mobilen Lernens* verorten.

### **5.1 Lerner/innen-zentriertes, soziales und kontextübergreifendes Lernen**

Einige der identifizierten Themen der Studie werden auch in der aktuellen Forschungsliteratur diskutiert: Es lassen sich z.B. Projekte finden, in denen lerner/innen-zentrierte und offen-strukturierte Unterrichtsmethoden eingesetzt und untersucht werden. Beispiele dafür sind Formen des erforschenden Lernens in den (natur-) wissenschaftlichen Fächern (Inquiry Learning), die mit Mobilgeräten unterstützt werden (vgl. z. B. das Personal Inquiry Projekt der Universität Nottingham und der Open University: Collins et al., 2008; oder Drayton, Falk, Stroud, Hobbs & Hammerman, 2010). Analog zu der vorliegenden Untersuchung beobachten z. B. Gaved et al., dass Lernende neugierig die Funktionen des Netbooks wie z. B. Kamera, Aufnahme und Spiele ausprobieren (2010). Die Literatur spiegelt auch die – in der Studie identifizierten – Ablenkungspotenziale wieder, die der Zugriff auf Netbooks und insbesondere die Kommunikationsmöglichkeiten im Klassenunterricht bergen und darum eine klare Strukturierung des Umgangs mit den Geräten notwendig machen (Roschelle, 2003; Gaved et al., 2010). Auch in Bezug auf soziale und kooperative Lernformen und Netbooks finden sich Beispiele: Im Rahmen einer Netbookstudie wurde – analog zu unserer Untersuchung – gezeigt, dass die Lernenden sich gegenseitig bei Fragen und Problem unterstützt haben, und dass sie die Geräte in der Freizeit für soziale Interaktion wie z. B. Kommunikationsfunktionen oder soziale Netzwerke genutzt haben (Gaved et al., 2010). Daneben finden sich zahlreiche weitere Beispiele, in denen Mobilgeräte soziales, kooperatives Lernen in schulischen Arrangements unterstützt haben (Für PDAs vgl. z. B. Roschelle, 2003; für weitere Beispiele siehe Frohberg, Göth, & Schwabe, 2009 «Socializing Context»). Studien über 1:1-Netbook-Initiativen berichten über eine gesteigerte Interaktion und Kooperation bei den Lernenden (Bebell & Kay, 2010). Demnach erachten wir Netbooks als Brücke für die Verknüpfung reichhaltiger sozialer Situationen über verschiedene Kontexte hinweg. Der kontextübergreifende Aspekt wird insbesondere in der *Mobile Learning* Literatur diskutiert. Dabei geht es um die Herausforderung, Lernprozesse nicht einfach zeitlich «in die Länge zu ziehen», sondern die pädagogischen Lernerfahrungen derart zu strukturieren, dass sie reziproker und kumulativer Natur sind. Es wird argumentiert, dass Mobiltechnologien und insbesondere Netbooks die Transitionen der Lernenden durch verschiedene Settings hindurch besonders gut ermöglichen, weil sie zahlreiche Phasen eines kontextübergreifenden Lernprozesses unterstützen können (Gaved et al., 2010).

## 5.2 Motivation und Lernwirkungen

In der Literatur wird berichtet, dass die Studierenden mehrheitlich positiv auf die Einführung von Mobilgeräten reagieren (Bebell & Kay, 2010). Bei ungefähr der Hälfte aller 1:1-Laptop-Studien haben Wissenschaftler/innen eine erhöhte Motivation der Lernenden festgestellt (vgl. Penuel, 2006). Beispielsweise berichten Lehrer/innen und Schuladministration von gesteigertem Engagement und Motivation der Lernenden (Bebell & Kay, 2010). Explizit durch Beobachtung oder durch skalierte Pre- und Postvergleiche wird die Motivation in bedeutend weniger Studien untersucht (für Beispiele siehe Penuel, 2006). Bebell & Kay haben grosse motivationale Effekte auch bei weniger starken (low-achieving) Schüler/innen gemessen (2010). Die Eignung von Netbooks für ein lernschwächeres Zielpublikum konnten wir in der Studie durch den erfolgreichen Einsatz der Geräte im Rahmen einer Kleinklasse zeigen.

Während – wie bereits angeführt – im Rahmen des Forschungsdesigns dieser Untersuchung die genaue Zuschreibung von Lerneffekten auf die Technologie weder sinnvoll noch möglich wäre, müssen wir bei einem Blick in die Literatur kritisch anmerken, dass die Einführung von computerbasierten Lerntechnologien wie z. B. Laptops in den Schulunterricht keine Erfolgsgeschichte ist. In qualitativ hochwertigen Studien konnte z. B. dem Einsatz von Computertechnologien in pädagogischen Kontexten bestenfalls marginale Wirkungen in Bezug auf Lernerfolg nachgewiesen werden (vgl. z. B. Weston & Bain, 2010; Penuel, 2006; Suhr, Hernandez, Grimes & Warschauer, 2010). Weder haben Computertechnologien bisher zu einer höheren LehrerInnen-Schüler/innen «Produktivität» noch zu einer Transformation von Lehr- und Lernpraktiken geführt (Cuban, 2001). Wesentlich wichtiger scheint diesbezüglich die Durchführung von innovativem, holistischen (fächerübergreifenden) lerner/innen-zentrierten, projekt- und problembasierten Unterricht (vgl. z. B. Cuban, 2003). Im Rahmen dieser Studie hat sich bestätigt, dass Netbooks solche Lernformen durchaus sehr wirkungsvoll unterstützen können.

## 5.3 Netbooks als Enabler für eine schulische Transformation hin zu lerner/innen-zentriertem Unterricht?

Bei einer breiten Anwendung von Netbooks in schulischen Kontexten müssen Verantwortungsträger/innen neben den hier vorgestellten Themen noch eine weitere Anzahl an didaktischen, organisatorischen, personellen, technischen und kulturellen Einflussgrößen berücksichtigen. Einige davon haben wir in unserer Studie identifiziert, können diese aber aus Platzgründen nur kurz skizzieren: Wir gehen beispielsweise davon aus, dass bei der Einführung von Netbooks umfassende Medien- und Kommunikationskompetenzen von Lehrenden und Lernenden berücksichtigt und gefördert werden müssen. Lehrende können z. B. im Rahmen in der Fort- und Weiterbildung auf einen Netbookeinsatz vorbereitet werden. Die Lernenden benötigen unserer Meinung nach bei der Einführung der Mobiltechno-

logien in den Unterricht besondere Unterstützung. Dies gilt insbesondere bei der gleichzeitigen Durchführung von lerner/innen-zentriertem Unterricht, der ebenfalls besondere Anforderungen an methodische Kompetenzen der Lehrenden resp. Selbstlernkompetenzen der Schüler/innen stellt. Der Aufwand für die Planung und Umsetzung von didaktisch anspruchsvollen, Netbook-gestützten Lernarrangements ist hoch und läuft Gefahr von den Lehrenden unterschätzt zu werden – wie sich auch bei den hier vorgestellten Fallbeispielen gezeigt hat. Ein weiterer Faktor, den Schulleitung, Lehrende und Eltern thematisiert haben, sind die Kosten für Hard- und Software. Eine Schulleiterin verwies hier zum Beispiel auf die beschränkten finanziellen Möglichkeiten einer Schule. Sie ergänzte, dass die Budgetplanungen der Schulen wenig Spielraum für spontane Projekte liessen und weitgehend stark reglementiert seien. Netbook-Projekte über die Eltern der Schüler/innen zu finanzieren, sah sie ebenfalls als kritisch. Ausgaben über mehrere hundert Franken für ein Netbook seien kaum vorstellbar. Dieser Tenor spiegelt sich auch in den Aussagen der befragten Eltern der CompiSternli-Kinder wider, die einer Selbstfinanzierung von Netbooks für Einzelprojekte eher kritisch gegenüberstehen. Trotz der stark gesunkenen Preise von Computertechnologie erachten wir die Kosten der Soft- und Hardware demnach weiterhin als einen limitierenden Faktor bei einem breitflächigen Einsatz von Netbooks. Eine einseitige Finanzierung durch die Eltern erscheint uns im Kontext dieser Studie keine Lösung zu sein. Längerfristig könnten IT Kosten in den Schulbudgets in Form einer Teilfinanzierung berücksichtigt werden. Für einen umfassenden Bericht mit allen identifizierten Einflussfaktoren siehe Gröbriel, Nissler & Pimmer, 2010. Ähnliche Themen werden auch in der Literatur diskutiert: Die sehr unterschiedlichen Ergebnisse diverser Fallbeispiele deuten z. B. darauf hin, dass für einen erfolgreichen Einsatz von Laptoptechnologien Einflussgrößen wie z. B. Lehrer/innenweiterbildung und Training, zeitnaher Support und – darüber hinaus – grundsätzliche Einstellungen zum Lernen sowie Werte der schulischen Akteure/-innen und (Schul-)kulturen ausschlaggebend sind (vgl. z. B. Bebell & Kay, 2010; Drayton et al., 2010).

Vor dem Hintergrund solch anspruchsvoller Rahmenbedingungen und komplexer Wirkungszusammenhänge kann nicht erwartet werden, dass – durch die Einführung von Netbooks – eine radikale Veränderung der Schule in Richtung innovativen, lerner/innen-zentrierten Unterrichtsformen leichthin ausgelöst werden kann. Entgegen den Hoffnungen mancher Anhänger des Technozentrismus ist die bereits vielfach angekündigte, technologiegetriebene Revolution der Schule nicht in Sicht. Abgesehen von wenigen Pilotbeispielen werden neue Technologien (zunächst) vielfach zur Unterstützung resp. Zementierung traditioneller Lehr- und Lernpraktiken eingesetzt (vgl. am Beispiel von E-Learning: Hug, 2009; Attwell, Cook & Ravenscroft, 2009). Netbooks können die Transformation von schulischem Lernen anregen und unterstützen. Dies ist aber ein langfristiger, evolutionärer Pro-

zess, der mit einer umfassenden, systemischen Änderung des Schulwesens verbunden ist (Cuban, 2003).

#### 5.4 Netbooks und mobiles Lernen

Obwohl ursprüngliche Perspektiven von mobilem Lernen stark auf PDAs und Mobiltelefone fokussiert waren, wird nicht nur bei der Betrachtung funktionaler Ähnlichkeiten von Netbooks und Mobiltelefonen, sondern auch bei der Analyse der einschlägigen Literatur deutlich, dass Netbook-gestütztes Lernen zentrale Eigenschaften von mobilem Lernen innehaben kann: Bereits die weit verbreiteten definitorischen Ansätze, die *mobiles Lernen* als *Lernen in und durch sich ständig verändernde(n) Kontexte(n) mithilfe von Mobilgeräten* (vgl. dazu z. B. Pachler, Bachmair & Cook, 2010; M. Sharples, Taylor & Vavoula, 2007) charakterisieren, zeigen Gemeinsamkeiten auf. Während sich einige Mobile Learning Studien auf Geräte konzentrieren, die einen Aspekt einer Lernphase (zumeist die Datensammlung) unterstützen, können Netbooks die Kontinuität des Lernens durch möglichst viele verschiedene Kontexte hindurch fördern (Gaved et al., 2010). Auch in den Fallbeispielen der vorliegenden Studie wird deutlich, wie trefflich kontextübergreifendes Lernen die didaktischen Einsatzmöglichkeiten von Netbooks charakterisiert.

Ein weiterer gemeinsamer Aspekt ist die Personalisierung der Geräte durch die Lernenden wie z. B. das Verändern des Hintergrundbilds oder die Anpassung der Startseite des Internetbrowsers, der auch in anderen Netbookstudien beobachtet wird (vgl. Gaved et al., 2010). Diese Personalisierung der Geräte kann als ein Teilaspekt der Aneignung (Appropriation) gesehen werden, dem Zunutzen machen und Anpassen der Geräte für eigene Zwecke und auf eigene Bedürfnisse. Aneignung ist ein in der *Mobile Learning* Forschung zentrales Konstrukt (vgl. z. B. Cook, Pachler & Bradley, 2008). Dies ist insofern beachtenswert, als die Schüler/innen die Netbooks nicht besessen (im Vergleich zur Nutzung von persönlichen Technologien wie Mobiltelefonen), sondern diese nur für einen befristeten Zeitraum ausgeliehen haben.

Angesichts der zentralen Gemeinsamkeiten von Netbookstudien und der *Mobile Learning* Literatur ist wenig verwunderlich, dass Erstere zunehmend in diversen *Mobile Learning* Konferenzen oder in einschlägigen *Mobile Learning* Zeitschriften zu finden sind (vgl. z. B. Anastopoulou et al., 2008; Collins et al., 2008; Anastopoulou et al., 2009).

## 6 Fazit

Zusammenfassend können wir festhalten, dass die vorliegende Studie einige in der Literatur diskutierte Konzepte substantiiert, detailliert und erweitert: Wir haben gezeigt, wie Netbooks in offen-strukturierten Lernumgebungen soziale, kooperative Lernpraktiken, kontextübergreifendes Lernen sowie multimedial-gestaltende Lernformen von Primarschülern ermöglicht oder unterstützt haben. In der

Untersuchung wird zudem die besondere Eignung und motivationale Wirkung der Methode «Lernen durch Lehren» im Rahmen eines Netbookeinsatzes deutlich. Die überwiegend lernerzentrierten Aktivitäten konnten durch Funktionalitäten des Netbooks gut unterstützt werden und haben zu einer grossen Akzeptanz, einer breiten Nutzung und hohen Motivation der Lernenden geführt.

Dennoch muss angesichts bisheriger Erfahrung mit Lerntechnologien angemerkt werden, dass der Weg zu einem breiten schulischen Einsatz von *innovativen* Netbook-gestützten Lernformen langfristiger und «evolutionärer» Natur sein wird.

Zudem kam zum Vorschein, dass einige der identifizierten Themen dieser Netbookstudie wie kontextübergreifendes Lernen und Aneignung zentrale Charakteristika der *Mobile Learning* Literatur widerspiegeln und somit interessante Rückschlüsse auf dieses Forschungsgebiet erlauben.

### Literatur

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## Evaluating Mobile Learning Practice

### Towards a framework for analysis of user-generated contexts with reference to the socio-cultural ecology of mobile learning

Judith Seipold and Norbert Pachler

#### Abstract

*Against the conceptual and theoretical background of a socio-culturally orientated approach to mobile learning (Pachler, Bachmair and Cook, 2010), this paper examines the evaluation of user-generated contexts by referring to an example from the use of mobile phones in schools.*

*We discuss how mobile device-related, user-generated contexts around structures, agency and cultural practices might be brought into a fruitful relationship with institution-based learning.*

*And, we provide categories for evaluating the use of mobile devices to generate meaning from and with fragmented and discontinuous media and modes at the interface of learning in formal, institutionalised and informal, self-directed settings. The evaluation criteria build on the framework of a socio-cultural ecology of mobile learning developed by the London Mobile Learning Group.*

#### 1 Introduction

In our society characterised by fragmentation (Schulze, 2000) and individualisation (Beck, 1986), consumption as well as information and knowledge delivery and production (see e. g. Pachler, Bachmair and Cook, 2010) are «chunked», structured and connected in very different ways from the lecture, the web and the book» (Traxler, 2010, p. 108; see also Hug, 2007). Yet, information and knowledge cannot just be «consumed» but have to be filtered and transformed in (individually) meaningful ways. Mobile devices as multimedia computers provide functionalities that allow users to deal with such distributed and fragmented information and knowledge – be they related to society or to media structures.

Mobile devices have become more and more embedded in the life-worlds of users; they have become normalized in everyday life. Because of the degree of integration they have achieved, they can be considered as important cultural resources; resources, which embody social values and carry ideological baggage (see Bruce and Hogan, 1998) and resources which are governed by social structures, cultural practices and user agency (Pachler, Bachmair and Cook, 2010). As convergent tools, they also allow for complex networking activities distributed across time and place. Mobile devices are attractive to us from an educational perspective

given the affordances they provide for meaning-making, for engaging with, and for mediating the world around us as well as for communicating with it (see Kress and Pachler, 2007). What is particularly striking, we find, is their increasing portability, functional convergence and connectivity, which affords a potential for social interactivity, ubiquitous information retrieval, processing and exchange as well as context sensitivity and location awareness. And, there is a noticeable trend in the reduction of cost of hardware and services as well as in personal ownership and attendant familiarity with, and personalization of them. Related to this trend is an increasing level of expertise of young people in mobile device use in the context of their participation in mass communication and their media use.

In recent publications, we have outlined not only the concept of a socio-cultural ecology of mobile learning in order to frame phenomena around the use of mobile devices from an educational perspective, but we have also described the different aspects of this concept against the background of the appropriation mechanisms of users and learners (see e. g. Pachler, Bachmair and Cook, 2010 and Pachler, Cook and Bachmair, 2010). In this paper, we focus on a dimension that we believe remains in need of more research, namely the evaluation of user-generated contexts. By using mobile technologies and convergent media, and by working with pieces and fragments of (distributed) contents and information, learners generate contexts. Such contexts are situations in which learners use and «appropriate» resources (see Pachler, Cook and Bachmair, 2010 for a detailed discussion of the notion of appropriation) that are available to them at the time of use in order to make meaning. Of particular relevance in this regard is the «chunked» nature of content (Traxler, 2010, p. 108). Content, be it «continuous» or «discontinuous» in its mode of representation, can be seen to provide pieces of information and embedded links to other content and contexts that are «filtered» and picked up by media users for the purpose of construction of individualised meaning – irrespective of the intention of the content makers and providers. We argue here that the notion of discontinuity has a key function in the appropriation process through reading and the production of contemporary, i. e. multimodal, texts as well as in meaning-making and learning processes, especially with mobile multimedia and multimodal devices. Text for us is not only written or spoken text, but also media, modes, genres, and – referring to Fiske (Fiske, 1989) – any other material, object or concept available. We view discontinuity as a cultural phenomenon that is particularly prevalent in the media and to have considerable implications for meaning-making and cultural practices such as learning and literacy, particularly in the context of mobile device use. Discontinuity in the context of learning with mobile devices we consider to be a certain break in consistency. This refers to sequencing and time line but also to aspects such as (distributed) authors, plot, and mainly in location of resources etc. Discontinuity is a characteristic of learning and meaning-making in our information society where learners are confronted with the need

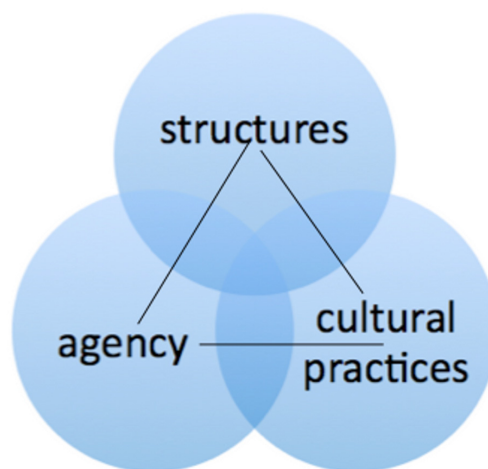
to construct coherent and «continuous» meanings from discontinuous resources. These resources are then objectified in the form of different kinds of texts. In the following, we briefly explore the key components of the socio-cultural ecology of mobile learning. After introducing an example of the production of micro-content by using mobile devices, we discuss the «chunked» and fragmented nature of information that is available to learners from different contexts as well as learners' ability to use these resources for the construction of (individualised and meaningful) contexts for learning. And, we provide criteria for the evaluation of mobile learning practice that refer to the socio-cultural ecology of mobile learning as meta-level as well as to user-generated contexts that can be described – in relation to the socio-cultural ecology – micro-level.

## 1 Theoretical background

### 1.1 A socio-cultural approach to learning with mobile devices

We take the view that «mobile» learning, or for that matter «e» learning or «ubiquitous» learning etc., do not point to a different kind of learning but, instead, to different conditions and environments of learning (Kress and Pachler, 2007). Mobile devices are part of users' creation of contexts and enable them not only to connect different contexts but also to create their own contexts for learning (see e.g. Pachler, Bachmair and Cook, 2010; Cook, Bradley, Lance, Smith and Haynes, 2007; Luckin et al., 2010). Also, we consider mobile learning to be about understanding and knowing how to utilize our everyday life-worlds as learning spaces. Given this framework, we do not subscribe to productivity-orientated and transmission-based notions of mobile learning (see also Pachler, Bachmair and Cook, 2010). Instead, we view it as concerning the processes of coming to know, and of being able to operate successfully in, and across, new and ever changing contexts and learning spaces with and through the use of mobile devices (which also gives evidence to links between mobile learning and concepts such as formation (Bildung) (see e.g. (Pachler, Bachmair and Cook, 2010; Bachmair, 2009, 2010). Therefore, from our perspective mobile learning is not primarily about technology. Instead, we focus on the process of meaning-making, particularly in the context of media use in everyday life, in semiotic terms between the making of signs and the making of concepts (Kress and Pachler, 2007). User-generated content and contexts for us are two significant dimensions of the mobilization of mass media. Both are the result of semiotic work: that is, purposive work with meaning resources (see Kress and Pachler, 2007). In our work, we focus on aspects of a socio-cultural ecology (see Pachler, Bachmair and Cook, 2010), with the learner at the intersection of:

- structures (convergence, milieus, fragmentation, provisionality, discontinuity),
- agency (appropriation, meaning-making, a new habitus of learning, naïve, native, expertise) and
- cultural practices (normalization, self-expression, communication, user-generated content and contexts).



**Figure 1:** Key components of a socio-cultural ecological approach to mobile learning (Pachler, Bachmair and Cook, 2010, p. 25)

### **1.2 Focus on appropriation and meaning-making**

From a socio-cultural perspective on mobile learning, the question about content delivery turns into a question about appropriation. This change in the understanding of media reception was described by Stuart Hall's 'encoding-decoding model' (Hall, 1980). This model helps us understand the dynamics of production and reception of media and content in mass-communication. It views media reception as a culturally situated and subjectively meaningful activity. Also, it relieves the recipients from passivity and affords them the role of active and constructive individuals who engage in meaningful media reception and the production of meaningful individualised contexts. Finally, the model affords media users an important role in the construction of contemporary landscapes of mass-communication.

Adopting a contemporary understanding of the structuration of society and participation mechanisms, the socio-cultural ecology draws on Anthony Giddens who, like Stuart Hall, is a key player in the field of Cultural Studies. According to Giddens (Giddens, 1997) structures leave their marks in people's agency and, conversely, people's agencies produce structures. This 'dualism' seeks to express

the interdependence of agency and structures and their interrelationship; the two dimensions – agency and structure – can be separated for analytical purposes only. Drawing on Hall as well as Giddens, we view media users as «consumers» who engage in appropriation – which can be seen as an instantiation of learning. We consider appropriation as processes of «interaction, assimilation and accommodation as well as change». Thus, appropriation is «closely linked to learning [...] understood as a process of meaning-making within social structures, cultural practices and agency» (Pachler, 2010, p. 162). Appropriation relates to all kinds of activities and interactions of people that aim to deal with information and media: «appropriation is a theoretical response to a society of individualised risks, which no longer has school learning as its preferred process of appropriation.» (Pachler, Bachmair and Cook, 2010, p. 224)

In the process of appropriation, users select those resources that are relevant for them in their meaning-making process against the background of their individual history with reference to their agency and cultural practices. In so doing, they construct new structures and contexts which are, in turn, meaningful in relation to already existing structures and in relation to the users' life-worlds.

As mentioned already, media users are confronted with pieces and fragments of information. Discontinuous text structures find their reflection in discontinuous text reading as appropriate agency and cultural practices. «Multi-tasking» as one example is an attendant pattern of media use that combines activities such as communication in a chat on Facebook whilst listening to music and doing one's homework (see Moser, 2008a, p. 290). Phenomena of dealing with information or, using the language of a socio-cultural ecology, cultural practices (i. e. routines in relatively stable situations and contexts) such as «multi-tasking», are evidence of orientation strategies which address the requirement for «selection» and «choice» in the process of dealing with fragmented pieces of content and information in a subjectively meaningful way. Through these selection and navigation strategies users express their agency and, through them, cultural practices become «materialised» or objectified – either as objects or as «spaces» such as contexts.

### **1.3 User-generated contexts: a micro-framework for analysing mobile learning**

Discussions around user- or learner-generated contexts are key within the field of mobile learning (see e.g. Brown, 2010). Referring to Paul Dourish (Dourish, 2004) we understand context as dynamic and created in (social) interaction. Situative and appropriate uses of resources to establish contexts and the dynamic nature of such contexts imply challenges for their evaluation and have consequences for replicability and transferability. Firstly, contexts are often perceived as limited in space and time, and thus ephemeral, as well as, at the same time, implying subsequent activities. Secondly, contexts refer to resources such as tools, structures, agencies etc. as well as to themselves. Thirdly, the subjectivity as well as skills,

knowledge and understanding of the learners generating contexts are central components of contexts. In a recent paper, Rosemary Luckin widens this view up to «across multiple physical spaces and times» (Luckin et al., 2010). Together with Luckin, John Cook (Cook, 2010) considers context not only limited to one specific place or a specific time frame, but the opportunity to learn across contexts and to create contexts within contexts.

In relation to mobile learning, concepts of, and theories around user-generated contexts are relevant for several reasons:

- they move the focus away from user-generated content and the idea that learning tools or given learning content are central within the learning process;
- traditional learning materials such as books are no longer the only resources for learning. Agency as well as technologies, structures, cultural practices, networks, information etc. become relevant as resources for learning;
- context models meet contemporary developments in mass communication as well as an understanding of learning as meaning-making within formal and informal structures, as both aspects focus on the user and the content and contexts s/he selects and produces;
- because contexts are not necessarily related to specific places, spaces outside the classroom become learning spaces;
- users/learners act flexibly and are able to adopt available resources and their affordances to specific situations of contexts; and
- the concept of user-generated contexts opens up the perspective on the learners' everyday life and to «informal» contexts and activities.

## **2 Learners generating contexts «on demand» by using mobile technologies and text fragments**

One example from a mobile learning project in a Swiss secondary school, which is described in detail in Pachler et al. (Pachler, Bachmair and Cook, 2010) as well as in (Seipold and the London Mobile Learning Group, LMLG, 2008-2010), shows how information from informal (learning) contexts can be combined with learning resources traditionally used in schools and how these learning resources combine different contexts and create new contexts.

The «Handy» project was realised by a teacher, Rolf Deubelbeiss, in a Swiss private secondary school with a specialism in sports (Nationale Elitesportschule Thurgau). The mobile phone was used as a learning tool as well as a topic of inquiry. The aims of the project were to educate students about and to support them in the use of their mobile phones. For the practical part of the project the students used their own mobile phones. There was no external financial or technical support. Students were asked to work on a topic with a view to producing «microlearning contents». Students were free to choose the school subject, as well as the media format

(film, picture, sound or text). The micro-content in the form of MMS (Multimedia Messaging Service) was saved as draft and distributed via Bluetooth to the project coordinator's mobile phone. He revised language and orthography, and uploaded the small units with his mobile phone to a public weblog. Some of the pictures used by the students were already available on their phones and thus not produced explicitly for the project. Other pictures were taken from a textbook. In most cases the project coordinator had to take a lead role and direct students towards being «creative» in composing the micro-content units. The weblog, as public place to store students' learning units, was produced by the project coordinator. Students could access the material, download it and use it as small learning units. Due to lack of space we can give only one example here of the learning material produced by students.

The first part of the featured example consists of a photo of a boy eating. Below it a commentary reads: «Here is my picture of Fabian :-» and here a sentence to go with it, in which you have to determine the parts of the sentence». The pupil poses the question: «Can you determine the parts of the sentence?» and writes the following sentence, structured 1 to 4: «1. Fabian 2. eats 3. a Hamburger 4. at the station.» Below the picture, in the final section, the answer is provided: «Solution: 1. Subject 2. Verb 3. Object 4. Prepositional object» (Translated from Deubelbeiss, 2007).



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### Satzglieder 3. Sek

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Hier mein Bild von Fabian :-» und hier einen Satz dazu, bei dem du die Satzglieder bestimmen musst:

#### Kannst du die Satzglieder bestimmen?

1. Fabian 2. isst 3. einen Hamburger 4. am Bahnhof

#### Lösung:

1. Subjekt
  2. Verb
  3. Objekt
  4. Präpositionalobjekt
- 

Figure 2: Syntax (Deubelbeiss, 2007)

This example consist of different sections which are subsequent and which belong together. The single pieces of information – a picture and written text – are from

different contexts of the learners' every-life: the picture is strongly related to aspects of life outside the curriculum and it refers to specific social situations as well as to consumption. Looking at the picture at face value it is difficult to bring it into a direct relationship with school, the curriculum and learning. The narrative that emerges around the image is at a distance to the curriculum – but of meaning and importance for the pupils against the background of their individual lives. In order to fulfil the learning task set by the teacher, the learner reverts to a mode of representation that is typical of, and characteristic for institutionalised learning: continuous written text. It is the text that carries much of the meaning. The content is obviously linked to school and learning: the construction of this short narrative, which tells about a boy at the station makes use of features such as example, explanation, question & answer.

The «reader» has to construct a relationship between the image and the written text but the framing as traditional grammar exercise provides coherence and continuity related to fragments that are originally from different contexts, i.e. school and everyday life. As a consequence, the learning unit as a whole tells a totally different story than its constituent parts: the learner tells us something about himself in relation to school learning. He is able to deal with learning material and content in terms of the curriculum and in meaningful ways. He is an expert in a specific subject domain and is able to provide this knowledge in a structured way to others. He is an expert in modes of representation prevalent in his everyday life as well as in modes that are characteristic for school and school-based learning. He knows how to combine text-fragments and pieces of information in order to produce a coherent and meaningful learning object. Also, he is able to transform subject experiences, knowledge and meanings into objective and meaningful products. By doing so, his knowledge is reconfigured and fits into the conceptual frame of the school and the curriculum. He is constructing user-generated contexts.

### **3 Criteria for the evaluation of mobile learning practice**

Aspects that emerge from this example need a framework that allows systematic evaluation. So far, we have outlined a model for the description and analysis of mobile learning practice on the basis of the socio-cultural ecology of mobile learning (see e.g. Pachler; Bachmair and Cook, 2010; Seipold, Pachler and Cook, 2009; Seipold and Pachler, 2009; Seipold and Pachler 2010,). This framework covers some of the aspects that we consider to be relevant to describe learning that emerges through the use of mobile devices. At the time of developing the following categories, we aimed to find a framework that allowed us to (a) describe learning with mobile technologies according to our conceptual framework and to (b) find areas that would allow us to widen our perspective on learning with mobile devices as well as (c) to enrich our conceptual framework by aspects that emerge from the practical use of mobile devices for learning. The concepts, theories and



questions covered in the following we considered as useful to approach these our aims. In its original iteration, this framework refers to the following five categories:

- **A** agency, structure, cultural practice (educational «script»): new habitus and social segmentation; «at-risk learners»; literacy traditional vs. new; understanding media as cultural resources; participation in cultural practices
- **B** approaches to teaching and learning (Didaktik) («didaktik» / learning / teaching scripts): informal / situated / collaborative / problem-based learning; bricolage; knowledge building; meaning-making
- **C** notions of mobility: mobile device used as tool; mobile devices used in relation to meanings; mobility in contexts (place, time, concepts, social constellations, activities, curriculum, cultural resources, meanings)
- **D** user-generated contents and contexts: transformation of mass communication; mobility; learning as meaning-making in context; ubiquity, choice, appropriation; context crossing
- **E** replicability and transferability: replicability and transferability of the «didaktik» script, using it in a new context; scalability

Also, we referred in an early stage of our research to the formal aspects «place» (inside school – outside school) and «didactic design» («closed», i. e. teacher centred – «open», i. e. learner centred and constructivist). These two areas are not meant to be criteria for evaluation, rather initial ideas about the didactic design of mobile learning practice.

However, even if this framework, which affords descriptive and hermeneutic analysis, was useful for our initial attempts to shape the socio-cultural ecology by mobile learning practice, we recognise that it lacks a clear operationalisation which allows for scalability.

Another scheme that attempts to allow a systematic approach to analyse learning with mobile devices are the «four parameters» (Pachler, Bachmair and Cook, 2010, p. 298). Each of these parameters has two poles which represent school and everyday life and attendant practices, activities, assumptions and modes:

- Parameter A: Learning sets  
Pole: Practice of the school – Pole: Practices of mobile media
- Parameter B: Relationship to the object of learning  
Pole: Mimetic reproduction – Pole: Personal reconstruction
- Parameter C: Institutional emphasis on expertise  
Pole: School curriculum – Pole: Personal expertise
- Parameter D: Modes of representation  
Pole: Discrete (mono media, mono modal) – Pole: Convergent

Combined, the «framework» and the «parameters» provide orientation in the form of a conceptual framework that considers any kind of resource available for meaning-

making, i. e. learning, and tries to elicit tensions that emerge within societal and technological structures but which can, at the same time, be taken as opposite poles between which mobile learning practice can be focused.

The categories proposed above allow for the analysis of mobile learning practice on the basis of a socio-cultural ecology of mobile learning. However, they don't answer the question how to evaluate user-generated contexts. In his recent research, Cook describes contexts as a micro-dimension of a socio-cultural ecology of mobile learning (Cook, 2010). With his 'typology-grid' for analysing mobile learning practice, Cook combines the key components of the socio-cultural ecology of mobile learning cultural practices, structures and agency with a formal description that attempts to cover the 'innovative' potential inherent in the learning design and 'micro dimensions' which cover 'user generated contexts' with aspects that relate to categories such as 'active learning', 'reflection' and 'attention'. By providing some key questions, the focus is on the interplay between 'intervention and innovation' and 'cultural practices', between 'intervention and innovation'

Intervention or innovation using networked hand-held device – the 'who what where when how' – is it radical (R) or incremental (I)	Cultural practices – things people do, i. e. 'stable routines'	Structures – digital media, technologies and systems	Agency – human capacity to act in the world	Micro dimensions, e. g. User Generated Contexts: active learning, reflection, attention etc.
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Table 1: Typology-grid for analysing mobile learning (Cook, 2010)

and 'structures' and between 'intervention and innovation' and 'agency'.

Cook also suggests the following questions:

- Which cultural practices does this intervention or innovations relate to, build upon, challenge etc?
- What Structures does it utilise? Are these 'standard' or 'bespoke'?
- How does Agency (human capacities to act in the world) affect the intervention, or how is the intervention dependent on Agency?

Our attempts to develop a framework for analysis and planning of mobile learning practice on the basis of a socio-cultural ecology of mobile learning, therefore, cover the following dimensions and concepts:

- a conceptual and theoretical framework: structures, agency and cultural practices;
- an analysis/planning tool with a focus on the interplay between school and everyday life: the four parameters; and

- an analysis/planning tool with a focus on the interplay between intended and actual use of mobile devices and the key components of a socio-cultural ecology of mobile learning and contexts.

Cook suggests that the «micro dimension» around user-generated contexts should focus on the appropriation mechanisms of learners. Accordingly, as our example has shown, a further step towards a socio-culturally informed evaluation scheme for mobile learning practice should be centred around appropriation as key reference point in the dynamic around structures, agency and cultural practices initialised and realised by the learner. This would also strengthen the link to concepts of contexts such as Dourish's notion of context as constructed through social interaction.

## 5 Conclusion

In this paper we explored categories for the evaluation of mobile learning practice across formal and informal settings which are based on our socio-cultural ecology of mobile learning. We proposed a perspective on the engagement with discontinuous (text) resources as context generation. In particular, we examined some characteristics of multimodal text production by learners and their potential for continuity and convergence by means of user-generated contexts. And we discussed some criteria for evaluation of mobile learning practice. We are aware that the categories provided are all but first steps towards a systematisation with a focus on appropriation by, as well as agency and cultural practices of learners.

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## Mobile Learning with Videos in Online Communities: The example of draufhaber.tv

Karsten D. Wolf and Klaus Rummler

### Abstract

*The article discusses processes of learning with user-generated video within social communities and its implementation through the online video platform draufhaber.tv. User-generated video, especially explanatory video and its organisation within online communities of practice, is seen as one of the major means of self-expression and learning of the future. Through six scenarios the article exemplifies the relevance of location and spatial orientation for learning and how this is might be used within draufhaber.tv.*

### 1 Introduction

Both the use of mobile media and online video content have surged dramatically over the past decade. The penetration of mobile devices is at nearly 100% amongst adolescents and about 20 to 25% of them have smartphones with internet access. The share of mobile internet compared to the total internet usage is still very little (about 2%) but rising by more than 100% per year. Online video is watched by more than 1 billion people worldwide, making up about 40% of all internet data traffic by the end of 2010 and about 57% in 2014, not including video content exchanged on P2P. The Cisco Visual Networking Index predicts a 39 times increase of mobile data traffic from 2009 to 2014; according to their forecast almost 66 percent of worldwide mobile data traffic will be video in 2014 (Cisco, 2010). Video has become at least as important as text on the web and mobile usage will further the dominance of video on the Internet.

Based on this premise, the «draufhaber.tv» project is an online video platform for young learners at the transition from school to vocational education. «Draufhaber» (he/she's got it; having a dab hand at something) is a German slang word for a person who can do something very well. The platform allows young learners to share resources about their interests with other people and to present their skills and their expertise from their individual perspective via user-generated videos taken with small cameras or with their mobile phones. Adolescents and young grown ups shoot and edit videos to either show their mastery of everyday skills and crafting processes (performance videos) or to explain them to others (instructional videos). Embedded tools for video editing and annotating provide users with an infrastructure to create re-mixes of peer videos to produce mashups of performance and

instructional videos. The platform is designed to help learners to organize themselves in communities of practice and to get in touch with apprentices and young professionals in different fields of interest in order to exchange knowledge and to get insights into possible professions, trades and careers.

To re-connect these informal and de-institutionalized learning processes to formal (vocational) education, draufhaber.tv supports a teacher and expert layer for professional reflection of user-generated videos. Furthermore, video-based documentation of their everyday life's cultural practices, interests and expertise are seen as a possible bridge to the job market especially for at-risk learners. Learners may select and comment their videos to create portfolios and submit them to potential employers.

This article first describes the basic learning framework of draufhaber.tv (Section 2) as well as specific concepts of learning with video (Section 3). It then explains the contribution of mobility in the context of the project and describes six scenarios of mobile learning within draufhaber.tv. The article concludes with a positioning of mobile video communities within the mobile complex.

## **2 Learning within online communities**

The phenomenon of learning within social communities on the internet can generally be conceptualised with *communities of practice* (CoP; Wenger, 1998). CoP are informal groups of individuals or networks with common goals and interests who communicate with each other over a longer period of time, who exchange experiences, who commonly solve problems, who collaboratively collect and build knowledge and learn from each other (Brown & Duguid, 1991; Shaffer & Anundsen, 1993; Wilson, 1995; Wolf, 1997). Learning within a CoP is a co-constructive and situative process (Lave & Wenger, 1991). The primary functional goals of the online community project draufhaber.tv, therefore, are to support and nurture (following Whittaker, Isaacs, & O'Day, 1997):

- common goals, interests, needs or activities of the members;
- repeated and active participation of the members;
- intensive interactions, strong emotional relationships and shared activities among the contributors;
- access to the shared resources with clearly defined rules of access;
- reciprocal activities like exchange of information, support and services among members;
- common rules of activity and common language;
- voluntary membership.

Sharing videos online as a «cultural space of participation» (Müller, 2009, p. 136) can be understood as collaborative production. It often means to capture glimpses, moments and personal experiences and to provide them to relevant others

with the least technical obstacles. As David Buckingham puts it with reference to taking videos in classrooms:

Set against the tendency towards individualization, group work needs to be perceived as a matter of mutual self-interest: students need to recognize that only by pooling resources, expertise and ideas can they get the job done. (Buckingham, 2003, p. 187)

More generally Wolf (2001, p. 199) presents a hierarchical model for participative learning in online communities (5C-model, see Figure 1):

**Create:** a basic element of a constructivist learning environment is to allow learners to create their own contents. By creating an external representation they make parts of their internal world model explicit.

**Construct:** instead of accumulating unrelated bits of knowledge, students need to construct a deeper structure connecting their own and other students' representations. They should identify parallels, connections, dependencies, and conclusions as well as omissions, contradictions, or errors.

**Communicate:** a central functional element of teaching-learning processes is the exchange of information, knowledge, experiences, opinions and attitudes between the learners as well as between the learners and the teacher. This can happen within a conversation but it is also possible to use other media such as a text, an illustration, a physical model, or an outline – public entities in the sense of Papert (1991). As shown in Figure 1, the curved arrows symbolize that communication processes depend on an active intake instead of a passive input.

**Cooperate:** learning is a process highly dependent on the willingness of the interaction partners to help each other. Asking for and receiving answers, help or guidance is a central learning activity. Cooperation can also mean to take over co-responsibility for other students' learning.

**Collaborate:** Collaboration means that two or more persons are jointly working to solve a problem or produce some entity, shouldering the responsibility for the result together. Both success and failure will be attributed to all members involved in collaboration.



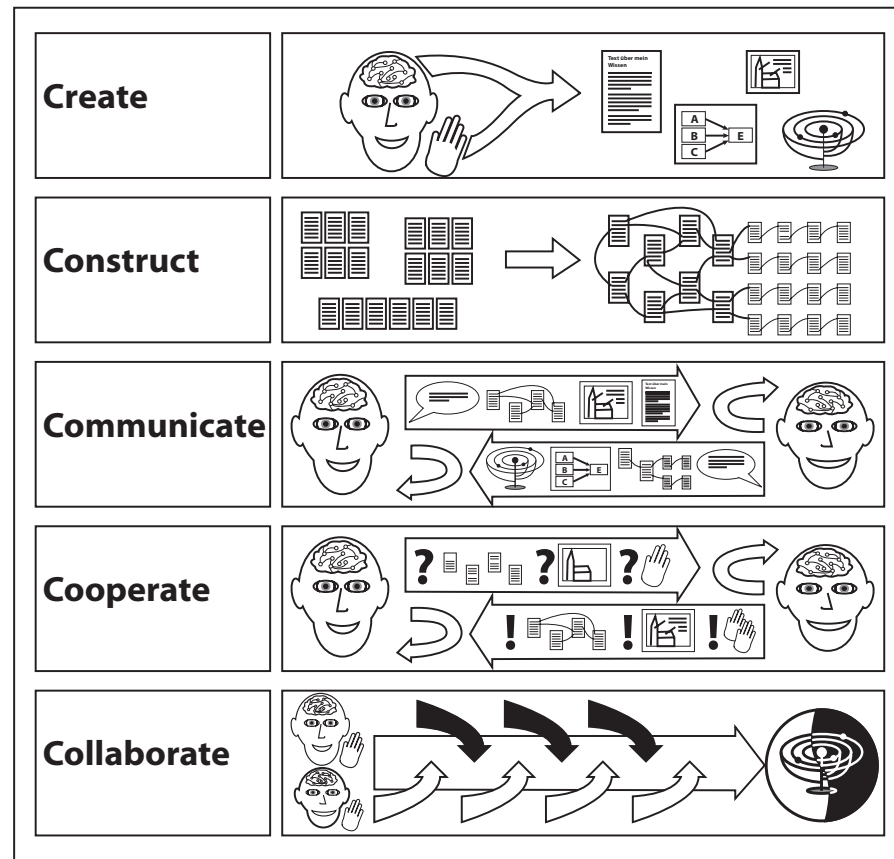


Figure 1: 5Cs of constructivist learning in groups (Wolf, 2001, p. 200)

John Seely Brown and Richard P. Adler (2008) presented a similar circular progression model that fosters «shared, distributed, reflective practicums in which experiences are collected, vetted, clustered, commented on, and tried out in new contexts» (Brown and Adler, 2008, p.28). Practicums in their view are «places where knowledge is created and stored» and distributed that should support «a process of creating/using/re-mixing (or creating/sharing/using)» (ibid). While their concept of practicums is for the most part equivalent to Seymour Papert's idea of public entities, they explicitly add an «open knowledge exchange zone», which «provides venues for sharing experiences / evidence to improve practice» by re-mixing.

## A Circle of Knowledge Building and Sharing

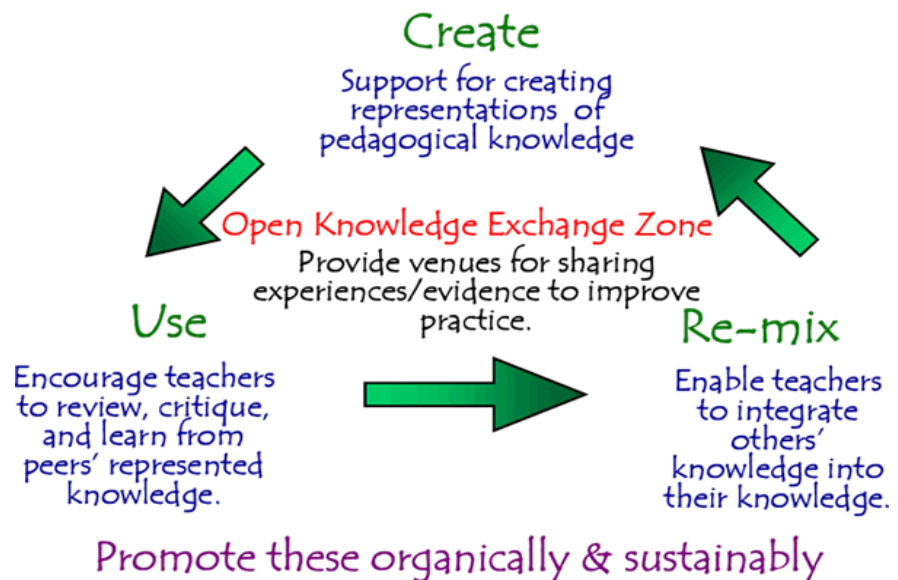


Figure 2: A Circle of Knowledge Building and Sharing (Brown & Adler, 2008, p. 28)

Draufhaber.tv is designed as a community service which strives to create such an open exchange zone by enabling sharing of videos to emphasize participation (e.g. creating, re-mixing). From individual creation and construction to communication, cooperation and finally collaboration (or co-creation), the platform tries to engage young people in meaningful learning activities, constructive reflection and creative self-expression.

### 3 Learning with user-generated video

Informal peer-learning depends on showing each other how to do something and to give feedback on first attempts and further refinements. Video seems to be a natural fit because of its relative ease to produce and to use – at least if the video production is more or less just a recorded real time demonstration with some helpful hints.

Although learning with video and the use of video in educational settings has a long tradition, there is just little reflection on the use of on-line video platforms for learning. Existing video platforms, such as 5min (<http://www.5min.com>), concentrate on explanatory content mostly based on simple models of learning. Videos on those platforms usually show the preparation and presentation as well as explanation of certain actions and operations. Those clips are often used as reference material. Users are expected to imitate the action by themselves in an

auto-didactic way. The control and the feedback about the quality of the action is usually missing.

In contrast to this simplistic instructional approach it seems necessary to take a wider theoretical basis for the question about the processes and the dynamics how learner-generated videos might scaffold learning. A starting point is a hierarchy of three learning models:

1. Observational learning
2. Learning by reflection and analysis
3. Learning by designing and teaching

*Observational learning* is the most obvious applicable learning model for video. The learner is first watching the video, trying to follow and understand the preparation, execution and explanation of certain actions and operations. The learner then tries to imitate what he or she has seen. The learner's personal reproduction might additionally be recorded on video and uploaded onto an online platform. This is quite common on YouTube in the form of video comments. For qualitative and motivational reasons it seems crucial that a video-platform like draufhaber.tv offers the possibility to give feedback by a real audience (Buckingham, 2003, p. 187) about the production of the video itself as well as about the depicted content.

*Learning by reflection and analysis* seems to be highly relevant in the context of user-generated video. Explaining everyday life facts, situations and relationships through video by the learners requires reflection and analysis on various levels. Pea and Lindgren (2008, pp.9f) describe three dimensions of video analysis:

1. discourse style: formal and prompted or informal and exploratory
3. relationship to source material: insider (own video; actor) or outsider (other learner's video);
3. target outcome:
  - α. design: improving on some product, process or scheme, e.g. how to do something better than shown in the video;
  - β. synthesis/pattern finding: reach consensus on «the big picture», e.g. how to do something in general;
  - γ. evaluation: critiques and constructive feedback on a video;
  - δ. analysis/interpretation: break down something into details; looking for causes.

In comparison to straight observational learning these dimensions help to scaffold reflective and analytic learning processes.

*Learning by teaching* (Martin, 2007) and the concept of *learning through design* (Papert, 1991; Kafai, 1996) challenges traditional role models in formal educational settings. Learners learn by explanation and use the very common means of video on draufhaber.tv. The non-fugacity of the medium video in contrast to spoken language requires planning, preparation, reflection and storyboarding to explain the topic effectively. Designing an effective instructional video to explain something requires a deep and founded understanding of the topic which enhances an intensive examination of the topic to be explained. This concept is especially supported by the real audience (Buckingham, 2003, p. 187) and the possibility of inter-related video commentary dialogues where users may pose questions and may give suggestions for improvements. Taking up the perspective of teaching enables at the same time new communicative modes and acknowledges the producers as experts who are well familiar with the topic that they refer about.

#### 4 Mobility as a cultural structure and the relevance of location for learning

##### 4.1 Mobility as a cultural structure within the framework of the «mobile complex»

The question for learning in mobile situations, involving small and smart networked devices requires a theoretic framework with an explicit origin in Mobile Learning. Under the headline «Mobile Complex» (Pachler et al., 2010, p. 175) the London Mobile Learning Group (LMLG; [www.londonmobilelearning.net](http://www.londonmobilelearning.net)) proposes a socio-cultural and ecological approach to discuss the appropriation of *world* within the wider context of mobile technologies in the perspective of development and learning.

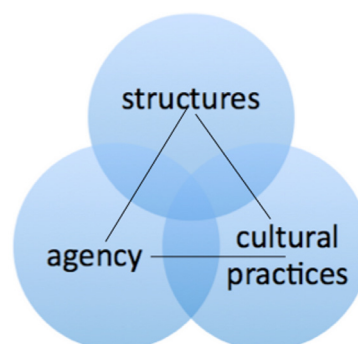


Figure 3: Socio-cultural ecology / mobile complex (Source: Pachler, Bachmair and Cook, 2010)

The mobile complex as a theoretical and conceptual framework for mobile learning describes a triangular relationship between (a) social, cultural and technological *structures*; (b) *cultural practices* such as the assumption how learning functions in school or how informal learning functions outside school; and (c) *agency*, such as the learners' acting upon the world, expressing themselves, taking part in the world, achieving certain goals when using media and making meaning within convergent environments. Agency also considers the learners' identity, his/her habitus of learning and their patterns of media usage.

Following the question about user-generated video as a learning activity, the learners' knowledge building process has to rely on their expertise and on the wider complex of their agency. draufhaber.tv is designed as a centralised platform service but with strong focus on mobile accessibility. The usage of draufhaber.tv as an environment for mobile learning shows its concrete contributions and relations to the mobile complex.

***Relationship to technological structures:***

draufhaber.tv as an on-line platform provides the central technological structure for learning in communities and learning with video. The learners' mobile phones with built-in cameras are pre-existing structures that draufhaber.tv takes up and makes use of. Internet access for mobile phones is still not as widespread as it is needed to fluently and satisfactorily use draufhaber.tv to upload videos from mobile phones. draufhaber.tv includes location-aware and context-sensitive services. It also provides on-line video editing and re-mixing functions as technological structures which enhance the possibility for all users to equally edit and produce own material without the need for complicated and expensive software.

***Relationship to cultural practices:***

Sharing digital artefacts and knowledge in communities is a meaningful *cultural practice* of learning outside school for young people. This type of sharing includes the cultural practice of viewing, sharing and uploading on-line videos. More generally, sharing in social communities relies on the common cultural practice of learning from each other, either by seeking help from peers or by showing and telling to each other. draufhaber.tv makes use of these cultural practices in order to enhance learners' agency.

***Relationship to agency:***

The pedagogic intention of draufhaber.tv is the enhancement and the empowerment of the individual's agency as well as the enhancement of the distributed agency of communities. In times of user-generated content and context this means to build upon the creativity of learners, to provide environments for reflective collaboration with video and to provide an environment such as draufhaber.tv

to support participation within a community. The empowerment of the learners' agency includes the provision and the production of videos for their own information, to help each other in solving simple tasks. More generally draufhaber.tv is also a resource for self-help in a broader holistic sense.

#### **4.2 Why does mobility and location matter for learning with video?**

The development of mass communication has shown an increasing «de-localisation» as we are increasingly able to bridge spatial boundaries with mobile technology, thus making our own location increasingly unimportant to access information and to communicate.

Friedrich Krotz states from the perspective of cultural and communication studies that globalisation adds to the loss of culturally homogeneous orientations and traditions in spatial neighbourhoods and thus contributes to the downfall of traditional mechanisms of social and cultural integration. (Krotz, 2007, p. 27) Adding to that, he explains and illustrates how mobile technologies and their ubiquity blur traditional spatial sites of media use, like watching television in the living room, the personal computer on the desk or the radio in the kitchen. (ibid, p. 95)

At the same time location-aware and context-sensitive services such as Gowalla, FourSquare etc. enable learners to share their geographical location and enable them to get in touch with others who are nearby or to find interesting local resources. It seems that the knowledge about one's own and others' location is a missing link to «re-localize» learning within the cultural structure of mobility and ubiquity. Location based services can support the learners' orientation within local and spatial structures.

Context-sensitive and location-aware mobile technologies create a need to raise the question of the relevance of spatial location for learning anew. We state that mobile video has the potential to be much more useful than desktop video for learning because it can be accessed right at the learning place. Video learning resources need to be available in practice to be useful. Mobile video unties the learner from the desktop into the action, e.g. under the engine bonnet to repair a car engine.

#### **4.3 Possible scenarios of mobile learning within draufhaber.tv**

Mobile and location-aware Internet technology provide a basis for *ubiquitous learning infrastructures*. Such infrastructures support on-site learning-by-problem-solving approaches by providing pervasive access to learning communities and re-attaching persons and knowledge to real places. Six scenarios emerge from this perspective (see also Wolf 2001, p. 214), which can be described from the draufhaber.tv project in the following schematic order:

- (a) **Location-based search and documentation of learning resources:**
  - Search for learning resources at a place.
  - Documentation of learning resources at a place.
- (b) **Location-based notification and monitoring**
  - Notification of nearby learning opportunities, resources and activities.
  - Monitoring learning opportunities, resources and activities at certain places of interest.
- (c) **Location-based networking and summoning**
  - Finding nearby co-learners.
  - Summoning learning advisors or experts for a place.

Scenario (a):

**Location-based search and documentation of learning resources**

*Search:* A girl and a boy are visiting a local skate park. To get an idea about the most interesting things to do, they open up draufhaber.tv on their smartphone. After searching for nearby videos, they see a map with videos taken at the park. They choose to view a couple of «360-flip» videos taken at a nearby ramp. After that, they try out the 360-flip by themselves.

*Documentation:* After perfecting their «360-flip» they take a video with their mobile phone how to do a «twin 360-flip» together on the ramp. The device writes the GPS location data automatically into the meta data of the video. When they upload the video to draufhaber.tv, they are being asked whether location data should be added to the video, which they accept. After having uploaded the video, their video shows up on the map next to other videos taken nearby.

Scenario (b):

**Location-based notification and monitoring**

*Notification:* A user on draufhaber.tv is a pupil in secondary education and is interested in hairstyling, doing make-up, and in street fashion. After leaving school she wants to be a hair stylist. On draufhaber.tv she is member of an «urban hair» group channel and has already uploaded some videos explaining fancy hair styles for street artists. She is always interested in new learning opportunities, so she has activated the notification feature of draufhaber.tv on her smartphone. While she is visiting her cousin in another part of her hometown, the draufhaber.tv app notifies her about a couple of great «hair styling tutorials» done by apprentices at two hair studios in the neighbourhood, which have been tagged as «great» in her «urban hair» group. After watching the videos she decides to visit one of the hair studios to ask for an internship.

*Monitoring:* The above learner who is interested in hairstyling, make-up and fashion recently visited a big city near her home town and found an interesting arts and performance school. Although she won't leave school until the next

year, she decides to monitor the school's area on draufhaber.tv for new uploads and activities. After following the activity at the school for some time, she decides to apply for the next term.

Scenario (c):

#### **Location-based networking and summoning**

*Finding nearby co-learners:* A young illustrator is moving to another town. He opens the draufhaber.tv app on his mobile phone and activates the notification feature of draufhaber.tv while he goes for a walk. His phone points him to an exhibition in a nearby urban youth club. While visiting the youth club, he discovers a video guide for the exhibition provided by a draufhaber.tv user who is member of the «illustrator» group. He sends a «meeting inquiry» to this group, providing some info about his interests, which is automatically sent to the local members. An hour later he receives a message with an invitation to a gallery opening this evening where he can meet two of the group members.

*Summoning learning advisors or experts for a place:* An apprentice for service and machinery is sent to repair a welding machine at a remote dockyard. The welding machine is a special customisation for the dockyard but the apprentice has access to the general manual for the machine only. As she cannot find any additional information to repair the machine, she visits draufhaber.tv on her tablet and starts a local search. She finds several videos, one of them gives some details about the customisation of the welding machine. She sends a connection request to the author, who is a specialist from the welding machine's manufacturer. The apprentice gets in touch with the expert via chat and with the help of the expert the apprentice is able to repair the machine.

### **5 Conclusion: linking user-generated video and learning to the real world on draufhaber.tv**

draufhaber.tv is a video online community with a strong local integration. It will augment the learners' activities with information about local learning opportunities, resources and vocational structures that might be of interest to the user. By means of location awareness it will provide bridges to local industries and enterprises with the learners' digital products (videos and e-portfolios). The information displayed around and with relevance to the learners' product will be «directly relevant to the context of the learning needs and the location of the learners» (Pachler et al., 2010, p. 45).

By providing several location-based services linking people, places and contents draufhaber.tv increases the value of user-generated explanatory videos. To «re-localize» online communication it is seen as crucial that draufhaber.tv provides links to physical present local and regional structures, such as educationally-framed youth work (*offene Jugendarbeit*), schools which learners attend, as well as local



enterprises as partners of the online platform who provide access to vocational education to the learners.

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## Experiences with an Online Mobile Learning Platform Intervention for Marginalised Young People

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### Abstract

*Marginalised young people who find themselves disadvantaged in a number of respects also tend to experience limited access to Information and Communication Technologies (ICT) – with the exception of mobile phones. The European Commission-funded Comeln project<sup>1</sup> seeks to take advantage of marginalised young people's access to mobile phones by reaching out to them via an innovative pedagogical approach based on the media convergence of the mobile phone through an online platform with video streaming. The platform was developed specifically for the purposes of the project to create the possibility for new, positive learning experiences as well as for interaction with peers and youth workers. In a three-month study in Austria and the United Kingdom, 94 young people accessed the platform via their mobile phones. In this paper we discuss the appropriateness of media convergence as a means for learning in and across three dimensions: interaction, creative expression and self-organisation. Furthermore, we explore how to incorporate initiatives such as Comeln in an institutionalised context.*

### 1 Introduction

The 16 years old Mirko was born and raised in Vienna in a Roma community. Although he is functional illiterate he managed to complete secondary school but since leaving school two years ago he has been inactive in terms of looking for a job or continuing education. Daria, 17 years old, has been seen by psychiatrists several times and her diagnoses range from depression to anxiety disorders and abnormal social behaviour. She grew up in different foster families and currently lives in a children's village. She dropped out of school once she had completed compulsory education and left without qualifications. Mirko and Daria might be called marginalised young people as for different reasons they stand at the margins of society and are at risk of being excluded.

Marginalised young people are disadvantaged in a number of ways, including in terms of reduced access to ICT such as the Internet. They, therefore, face a so-called Digital Divide, i. e. a gap between the «information rich» and the «information poor» depending on whether they have access to modern media (cf. Norris, 2001; Yu, 2006). While this gap clearly affects marginalised young people, their access to mobile phones is not affected that much (Livingstone & Helsper, 2007).

<sup>1</sup> <http://www.comein-project.eu/>

On the contrary, for marginalised young people mobile phones are of particular relevance and offer them features that support access to information and networks (cf. Pachler, Cook & Bachmair, 2010).

The EU-funded Comeln project – Online Mobile Communities to Facilitate the Social Inclusion of Young Marginalised People – aims to study factors contributing to marginalisation and to alleviate some of these by developing an online mobile learning platform tailored to the needs of the target group. This intervention is expected to some extent to contribute to interrupting the vicious circle of marginalisation of young people who have already dropped out of school or do not proceed education or employment after compulsory school graduation.

## **2 Marginalised young people**

Today's youth is considered by many researchers as «being at risk» during their transition to adulthood: «The terms risk and youth have become synonymous, and young people are increasingly perceived as either «at risk» or as «posing a risk» (Armstrong, 2004; Goldson, 1999; Swadener & Lubeck, 1995; as cited in Kemshall, 2008, p. 22). In modern societies, this transition process has become longer and more complicated as a result of the extension of secondary education, accompanied by the diversification and individualisation of social life, corresponding to what sociologists call «diversification of pathways into adulthood» (Biggart, Bendit, Cairns, Hein & Mörch, 2004, p. 13). However, certain groups of young people can be seen as being more at risk of social exclusions than other groups. Young people who have to contend «with a plurality of obstacles in attempting to make transitions into adulthood, but have relatively few resources with which to do so» (Parry, 2006, p. 296) are defined as marginalised young people or «at risk» youth or simply as young people with fewer possibilities.

Contributing factors that can be identified in studies about marginalisation processes among young people comprise six distinct dimensions (cf. Brüning & Kuwan, 2002; Kieselbach, Heeringen, Lemkow, Sokou & Starrin, 2001; Nyssölä, 1999; Kritikos & Ching, 2005): labour market-related, economical, cultural, social, geographical and institutional dimensions. Brüning and Kuwan (2002) argue that social exclusion is probable if a person is affected at least on three of these dimensions. According to Wagner, Gerlich and Gebel (2008) marginalisation occurs as interaction of factors on different levels: on the micro-level (e.g. personal premises, talents and interests), on the meso-level (e.g. social milieu, status, family) and on the macro-level (e.g. structural conditions, societal values and norms). Disadvantages are interlinked and clustered and only when a young person «has a weak position in a number of arenas simultaneously can we talk of marginalisation» (Heggen, 2000, p. 48). Thereby factors that lead them into marginalisation and symptoms

of marginalisation that has already taken place are interchangeable, making the process of marginalisation a vicious circle which is difficult to break.

### **2.1 Marginalised young people and digital media skills**

Young people affected by marginalisation do not only experience the digital divide in terms of diminished access to ICT but also their preferences and their media skills are different from other youths. Thus, the scientific as well as policy discussion has moved from the «digital divide» to the «participatory divide» (Biermann, 2009) resulting in an increasing demand for specific pedagogies and educational offers for marginalised young people besides providing mere access. New pedagogical concepts are needed that tie in with daily media experiences and interests of marginalised young people and at the same time reduce the reproduction cycle of social inequity to some extent as Biermann (2009) postulates.

Similar to their peers, marginalised young people make extensive use of their mobile phones. Most, however, do not use further information and communication technologies on a regular basis. This does not imply that they would reject them altogether but it has to be seen in light of, to some extent, limited reading and writing (literacy) skills among marginalised young people and the fact that many communities and features seem to be too complex and too text-orientated for them (cf. Bachmair, Pachler & Cook, 2009). The project Comeln has dedicated itself to finding a way to building on individual skills of marginalised young people and to offer new positive learning experiences that enable them to create their own content and not solely reduce them to content consumers.

### **2.2 Target group of Comeln**

Mirko and Daria are two of the 94 young people who participated in the three months long Comeln pilot.

The pedagogical approach as well as the technological development of the online platform in Comeln were specifically developed for young people such as Mirko and Daria, i. e. young people between the ages of 14 and 21 who are neither in employment nor education, thus who have been inactive for at least six months and who experience difficulties in entering into the labour market or in proceeding with their educational activities for whatever reasons. Thus, the target group in focus is marginalised on two specific, but significant dimensions: education and economy, i. e. young people with educational and income-determined barriers. Both, Mirko and Daria, have been visiting a youth organisation in Vienna that supports them in employment seeking activities and offers them internships to get some work experience. Youth workers who had been working with Mirko and Daria asked them to take part in the Comeln project. Similarly, the young people who finally participated in the pilot were in contact with a youth organisation in the UK or in Austria and were approached by youth workers to take part in the Comeln pilot.

Participants came from different regions of the UK and Austria and had a balanced distribution of age and gender as Table 1 shows.

		Range of Ages			
		14–16		17–21	
		Male	Female	Male	Female
COUNTRY	AUSTRIA	12	8	18	10
	UNITED KINGDOM	12	12	12	12

**Table 1:** Sample of participants by country, gender and age range

The sample of 94 young marginalised young people had the following characteristics<sup>2</sup>: their highest educational level was low or medium with corresponding low to medium literacy and numeracy skills levels. Most of the participants had dropped out of school before completing secondary school or had quit education after completion of secondary school. Some reported they had made negative experiences at school such as not feeling competent enough in comparison to other pupils or they simply expressed their wish to work instead of continuing with their education.

The life circumstances and attested diagnoses differed among the participants. Most of them still lived with their families but often lacked an important reference person in their homes and did not get much support by family members. Some young people reported cognitive impairments such as Asperger syndrome, functional illiteracy or learning difficulties. Others were diagnosed with a personality disorder, depression, anxiety disorder or another psycho-social disorder.

In terms of ICT interest, they preferred mobile phones and had medium ICT competences. In terms of relationships, most of the participants had not known other people in the sample before.

The pilot participants were diverse in terms of the difficulties they experienced in their lives but all shared the status of «inactivity» in terms of engagement in employment and education and showed an interest in ICT and in the Comeln project.

<sup>2</sup> Data was gathered through semi-structured interviews with pilot participants and youth workers.

### **3 The pedagogical approach**

One step towards social inclusion is to undergo positive learning experiences and thus (re)engage school dropouts in learning processes. For marginalised young people those experiences have to be outside of the formal education system and have to happen in alternative forms to traditional ways of teaching at school. Thus, one of the demands for a new pedagogical approach is to make use of the fun aspect of young people's devices, using attractive means of ICT, and extend their interests from pure consumption of content to the creation of content. The idea was to invite them to make use of tools they like and know. By means of the mobile phone and a simple audio-video based communication approach, they could express themselves in media they knew and were familiar with and decide when and where they would take part in a self-determined learning process. The learning goal for the participants of the project was to promote basic skills required by the labour market in terms of interaction (social norms and behaviour), creative expression (self-reflection and self-regulation) and self-organisation.

#### **3.1 A mobile community platform tailored to the needs of the target group**

The Comeln project developed an online mobile community platform, i. e. an on-line video stream-based platform that gathers community features and can be accessed via mobile phones, resulting in a media convergence of «mobile phone», «online community» and «video» as media format. To engage young marginalised people in this self-determined community and in collaborative informal learning processes a simple pedagogical concept was worked out. The platform developed for the purposes of the project aimed at reflecting the needs of the target group and offering them a protected zone only registered pilot participants could enter. Although community platforms which can be accessed via mobile phone are already available, e. g. Facebook, these would not have supported our purposes as the project *inter alia* required a restricted platform. Based on the results of an extensive literature review and a user requirement analysis the Comeln platform was developed. For instance, the platform had to be based on visual communication so that even people with limited or restricted literacy skills such as Mirko were able to participate. For young people such as Daria easy navigation across the platform was crucial as she had experienced information overflow in other social networking sites. Thus, the platform developed was characterised by a simple and clear user interface with some basic features that supported the main target activities of participants (cf. Figure 1). They could create their own profiles and engage in several community activities: a personal account with a nick name, a photo and individual settings, the possibility to create, moderate and join groups, the possibility of sending messages via the platform, add favourites, and above all, special features for video communication, such as streaming, uploading, replying to and rating of videos.

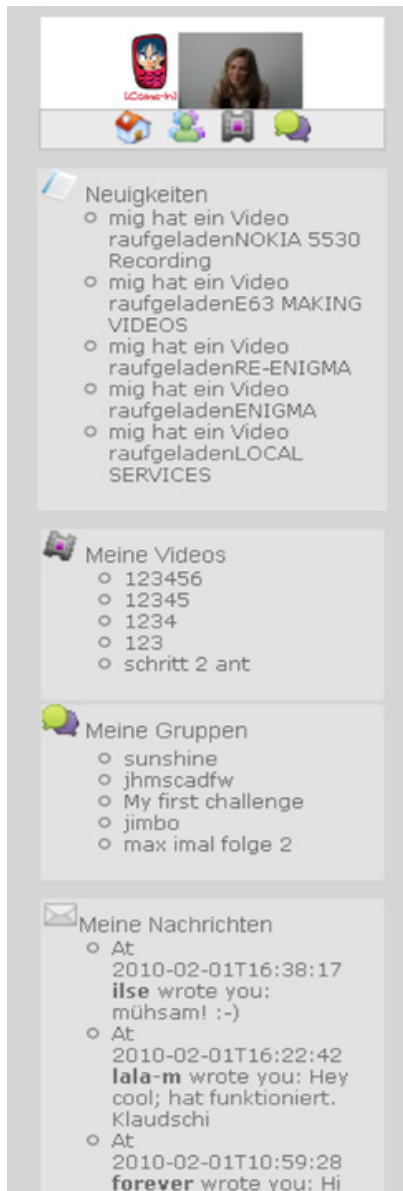


Figure 1: Screenshots of Comeln platform: user site

Thus, most of the communication on the platform was meant to be based on short videos which could be created with the built-in cameras of their mobile phones and be immediately uploaded to the platform via a 3G connection.

### 3.2 Video-ping-pong approach

To enhance interactivity on the platform and to stimulate contributions of pilot participants a reciprocity concept was chosen as the main communication channel, the so-called ping-pong approach promoting the exchange of self-made videos. As marginalised youths are rather challenged by tasks that require self-organisation and self-regulated learning (Kritikos & Ching, 2005), moderator roles as personal guides were introduced to the platform. Youth workers with a long experience of working with marginalised young people were chosen as moderators of the platform and they further supported the research team in working out the pedagogical concept. In total eight youth workers were trained and engaged as moderators on the platform. Their role was to stimulate participation of the young people, to support them in case of problems or questions being raised, to safeguard netiquette rules on the platform and to provide feedback. Furthermore, they were asked to keep a diary on all the interventions (which could take place directly on the platform, or via text messages, calls or face-to-face). The research team, together with the moderators, created «challenge videos» which contained learning tasks about personal development and skills relevant in employment. For each of the 12 learning steps several challenge videos were produced and uploaded to the platform by the moderators on a weekly basis.

The idea of the challenge videos was, on the one hand, to provoke self-reflection on specific topics, such as in step 1 to reflect on one's skills or in step 4 how to motivate oneself (cf. Table 2). On the other hand, the videos aimed at stimulating interaction among participants so that they would comment on each other's ideas referring to the challenge videos and exchange their thoughts.

Daria, for instance, created a video referring to learning step 1, i. e. self introduction, showing one of her favourite activities – singing and dancing – and received feedback from other peers in the form of positive ratings and comments. Responding



1	Self introduction
2	Job and other activity portraits
3	Self organisation
4	Motivation
5	Job application
6	Keeping a job, job routine
7	Difficulties, rights and duties
8	Communication and social competences
9	Dealing with Money
10	Help and support
11	Health aspects
12	Strategies and future steps.

**Table 2:** Learning steps overview

to learning step 4, Mirko broadcast himself, speaking directly into the camera presenting several ideas how to motivate himself (such as rewarding himself when he had accomplished something).

All challenge videos followed a simple script which embedded it in an engaging story and a task or a question to solve. The challenge videos were no more than 40 seconds long and were produced without editing and without any further equipment besides the build-in camera of the mobile phone. Different «characters» performed in these challenge videos: youth workers, young people, puppets and animals. For instance, in one of the challenge videos referring to learning step 4, which deals with self-motivation, one of the youth workers, who also acted as moderator on the platform, tries to motivate a dog who is lying down on the floor and does not move. At the end she succeeds and poses the following question to the camera: «When you have a bad day how do you motivate yourself?» (see Figure 2).



**Figure 2:** Challenge video for learning step 4

The twelve steps were sequenced in a way that tasks became more complex or challenging later on in the pilot. Every week several challenge videos that all referred to the same learning step were uploaded and participants were free to react to these by producing a video with their answer or solution allowing for a self-determined learning process. Their answer video, in turn, then received a feedback video created by the moderators or by other young people resulting in videos that related to each other which the research team called the video-ping-pong approach as depicted in Figure 3.

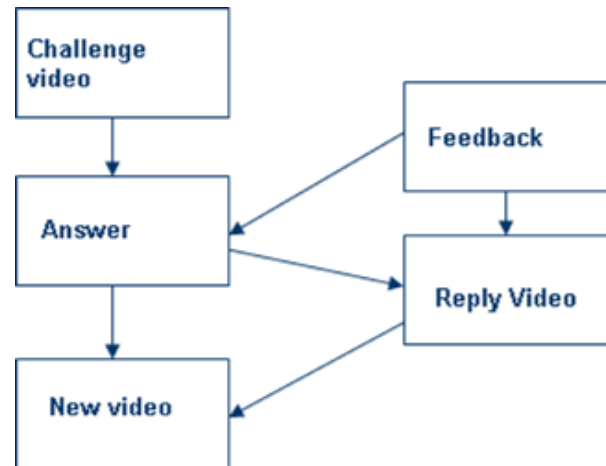


Figure 3: Video-ping-pong approach

All challenge videos were created in order to stimulate participation of the young people but did not have a mandatory character. Neither was the answer video predefined. Participants could create answer videos on their own, collaborate with others, simply speak into the camera, «act» or record something. Participants could also create their own challenges or relate their videos to those by other participants. Ideally, there were answer videos to challenge videos and reply videos by other participants to answer videos. Furthermore, the platform members could use all the features of the platform to relate to others: send text messages, share videos, rate videos, create groups on a specific topic and subscribe to groups that have been created by others.

#### 4 Comeln pilot study in focus

For the pilot phase the participating marginalised young people were provided with a mobile phone and an appropriate package of provider offers to allow for active pilot participation free of cost. During face-to-face introductory sessions in different regions, participants were introduced to the study and committed themselves to the pilot and the platform netiquette rules. During these introductory sessions, participants could also experience the first platform activities and, in an interactive way, learn how to make videos with the mobile phone, upload them to the platform and use all features of the online mobile learning platform.

During the pilot the moderators then uploaded the challenge videos according to the learning step schedule and provided feedback videos for all those who had responded to the challenge video (see Figure 4).

An intermediate face-to-face meeting gathered preliminary feedback from participants and some suggestions for improvement. During the pilot period, participants were in regular contact with the moderators, either via the platform, by phone or face-to-face. During concluding face-to-face sessions, the mobile phones they had already used during the pilot were given to them as reward and participants received a certificate for their successful participation which they could attach to their job applications.

#### 4.1 Evaluation methodology

Pilot activities provided a range of different data to be collected at different stages of the pilot phase. Data from the following sources were analysed:

- Direct contact with the participants (focus group discussions, interviews, video feedback questions)
- Direct contact with moderators (interviews, group interview<sup>3</sup>)
- Documentation and pilot diaries of moderators
- Log-data of users on platform
- Platform activities (messages, groups, ratings, etc.)

The basis for the analysis of the pilot results was a triangulation of qualitative and quantitative methodologies carried out based on the different data sources. Qualitative analysis was worked out of transcripts of group discussions and interviews which were conducted at an intermediate stage and at the final stage of the pilot phase. Based on log-data, quantitative analysis showed all relevant numbers of participants' activities, such as time spent online, number of uploaded videos, number of watched videos, etc. A social network analysis showed different forms of interactions between pilot participants. For the artefact analysis of platform videos, an external team of three experts of different representative fields (media

<sup>3</sup> The authors refer to the interview and focus group data gathered solely in Austria. Thus due to the limited availability of data in case of the UK participants, in this article, comparisons between the two pilot sites were avoided.

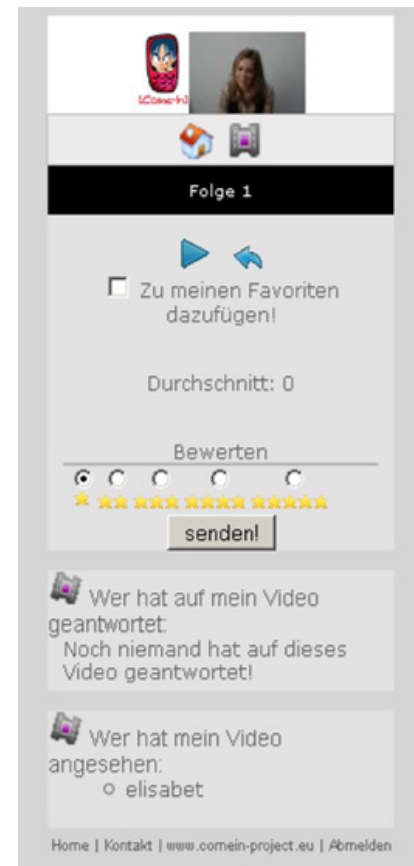


Figure 4: Screenshots of Comeln platform with uploaded challenge video

pedagogy and evaluation) screened 160 uploaded videos (80 from the UK Pilot and 80 from Austria), including feedback videos created by pilot participants.

## **5 Results**

This paper explores the impact of the pedagogical approach based on media convergence of «mobile phone», «online community» and «video» as media format along three different dimensions of learning that might have occurred among the pilot participants: interaction dimension (social norms and behaviour), creative expression dimension (self-reflection and self-regulation) and self-organisation dimension.

The results are based on various sources of data as described above. Besides reacting to challenge videos, the young people benefited from their participation through their creative use of the platform as will be shown.

### **5.1 Interaction dimension**

In the three months long pilot the community slowly developed and became vivid and lively with increasing interactions between its members, both between peers as well as between moderators and young participants. In total, the community uploaded 585 self-created videos to the platform which were viewed 3,759 times and rated another 508 times. Additionally, community members exchanged 1,983 personal messages and posted another 722 messages in groups. In total, they created 66 groups that all had a specific topic which were filled with videos as well as messages. These groups were subscribed 639 times and dealt with diverse topics that ranged from «childhood memories» or «hairdressing» to «kids having kids» or «school dayzzzz». By means of creating a new group, young people had the possibility to interact and exchange ideas about specific topics that were of interest and relevance to their lives.

The social network analysis, a method, that allows interaction between members of a community to be demonstrated, shows that the different pilot participants have acquired different roles on the mobile online learning platform. Some have central positions, i. e. they function as connectors between other people and are strongly tied to others in terms of exchanged personal messages, while others rarely communicate with others using textual exchange. In Figure 5, each participant is represented as a yellow circle with their given ID number to preserve anonymity while the size of the circle correlates to the number of messages sent. The black lines show exchanged messages between two specific participants. Again, the size of the line represents the number of messages sent and received. As a whole, the social network analysis reveals a good level of reciprocity (67 MYPs are in reciprocal contact) which means that both the sender and the receiver of the text message are interested in communication and able to connect to the ComelN platform.

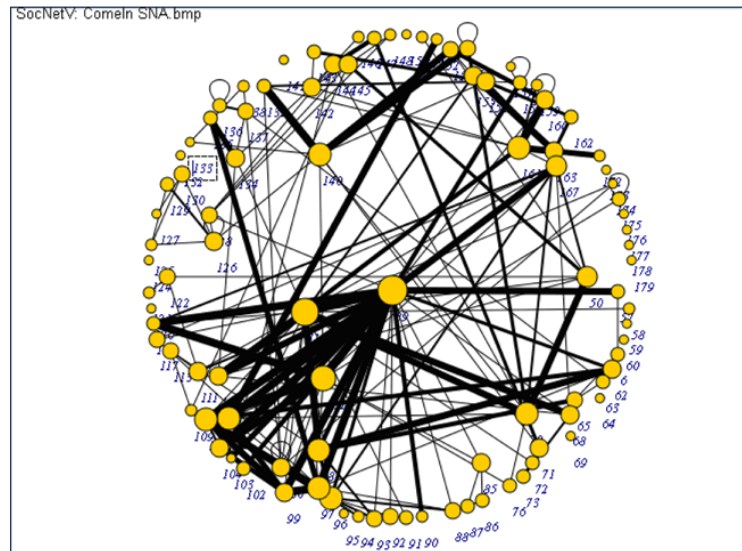


Figure 5: MYP-to-MYP network during pilot in terms of personal messages

Daria became a heavy exchanger of messages in the community. She is at the very central position of the network in Figure 5, having very strong ties to many other community members. She contacted many other young people on the platform and got many messages in return. Even language barriers did not keep her from contacting participants in the UK, instead she engaged in communicating in English and helping other participants to communicate in the foreign language.

Others did not use the messaging function as frequently but preferred video-based communication instead. Mirko, for example, who due to literacy problems was not able to write or read textual messages, uploaded many videos and reacted to others' videos to express his ideas and to comment on others.

«To make new friends» and to «get to know people from abroad» were the most popular motivators to take part in the community that emerged during the focus groups with the participants. The platform supported various communication styles and skills as the pilot experience shows. It was seamlessly used by people with different mother tongues, by people with literacy problems as well as people with Asperger syndrome or with an antisocial personality disorder. Depending on their skills, they chose visually-based communication or text-based communication. In the first case, people who relied more on visually-based communication, would rather have accessed videos and commented on the videos of others while in the second case, people with an emphasis on text-based communication, chose to send messages or to post messages in a group.

Not only did the young participants benefit from the interaction with peers but they also benefited from the interaction with the moderators. They could contact the moderators at any time and did not have to wait until the next face-to-face-

meeting. Conversely, the moderators could get in touch with young people they were worried about or who had not contacted the youth organisation for some time. Also, they appreciated the platform as an additional channel for communication and to get to know the young people better as well as to use that information as ice-breaker in face-to-face contacts as the moderators mentioned in interviews.

### 5.2 Creative expression dimension

As Mirko has poor literacy skills, shooting videos was the perfect way for him to express himself. Mirko loved presenting himself in front of the camera sharing daily experiences and let others get some insights into his life. For instance, Mirko recorded a wedding in the Roma community; another video showed a person playing a typical Roma instrument. Mirko recorded his neighbourhood, his room, his favourite objects, his personal belongings and introduced family members and friends in the form of videos posted to the online community. Daria used the platform like a diary. Almost every day she recorded a video and uploaded it to the platform. Most of the time, she recorded herself speaking directly into the camera sharing her thoughts on different topics such as first impressions at a new internship placement.

As previously mentioned, the pilot participants took advantage of the different channels of communication depending on their skills and interests. The participants similarly adopted the video-ping-pong approach for creative self-expression as the in-depth analysis of videos created by the Austrian participants, which were more closely analysed, reveals. Table 3 shows that out of 231 videos from the Vienna pilot, 84% were self-made with the built-in camera of the mobile phone and only 1% were taken from the mobile phone (some videos were already available on the mobile phone), while 14% of the videos were video clips filmed from the Internet, from television or video games.

title	content							where		video production			place			theme		
	overall percentage	video percentage	photo percentage	audio percentage	text percentage	other percentage	other percentage	mobile phone	internet	other percentage	self-made percentage	other percentage	other percentage	other percentage	other percentage	other percentage	other percentage	
<b>SUMMARY</b>	106	125	163	63	40	40	24	97	212	19	195	3	33	4	178	43	115	116
	46%	54%	71%	27%	17%	17%	10%	42%	92%	8%	84%	1%	14%	2%	77%	21%	50%	50%

Table 3: Summary of uploaded videos of the Viennese participants

Interestingly, 92% of the videos were taken inside and only 8% were taken outside, which could be interpreted in a way that the most relevant issues in their lives are related to indoor activities or that filming outside can sometimes be rather challenging with background noise that are difficult to control.

One of the videos uploaded referring to learning step 3, self organisation, that had been taken outside, showed a finger moving around the metro map of Vienna demonstrating how to reach specific locations across the city. An example of a

video which was taken inside shows two participants playing roles in a typical job interview situation as reaction to learning step 5 (job application). The videos were mainly taken during participants' free time (77%), only 21% show the surrounding of their youth institution and 2% represent a job situation (some of them did an internship during the period of the pilot and were often not allowed to use their mobile phones during working hours). In one video one of these interns shares her experience at McDonalds where she had been working for some days.

Half of the videos uploaded directly related to the pilot and the challenge videos on the ComelN platform and half of them were not specifically linked to them. Around 46% of the analysed videos were given a specific name, while in 54% of cases the default name was kept (a long number which was assigned by the mobile phone). These proportions have to be interpreted in the light of the limited literacy skills of some participants and of the default setting of the mobile phones. The analysis of the video contents reveals how the participants introduced themselves to the community. Around 71% of the videos show other people, 27% show themselves, 17% colleagues, 17% friends and family, 10% animals and 42% objects. Obviously, more than one of these categories could be present in one single video. They either liked to present themselves by speaking into the camera or asked their moderators or peers to introduce them. One young person used the hero of his favourite video game and produced a voiceover to introduce himself. Other young people preferred to film their own rooms or favourite objects, such as motorbikes and furniture. The television was a recurrent object in the videos and obviously was of high relevance for some participants who filmed the family watching television together. Others presented their favourite animals such as horses, cats, dogs and fish or family members like mother, father, brother, sister and friends. Some videos showed a creative dramaturgy. For instance, one boy described the preparation of a dish in the kitchen of the youth institution like a football game commentator or a girl introduced herself as a «cloud» by jumping in a container full with leaves. In the interviews, the participants pointed out that the most popular topics were friends – especially boyfriends, animals, hobbies and favourite locations. Out of 24 participants interviewed, only two underlined that they did not like to take videos at all and one girl stressed that she was too afraid to put a video on the ComelN platform.

As the log-data reveals, the number of videos uploaded varied among the participants with the highest number being 55 and the lowest being zero. The video-analysis of the independent experts confirms the results from the Austrian pilot. According to them, the most frequent content was related to daily-life activities and home-settings. Entertaining elements such as video-games and television as well as the observation of relevant places, family and friends were represented. According to the experts, words did not have an important role in their creation.

Besides making use of self-made videos, the participants also expressed their creativity through the creation of groups on the platform. The analysis of the creation of groups shows that older females were the most active users in creating new groups and subscribing to groups, while young males were less engaged in these activities.

### **5.3 Self-organisation dimension**

One conclusion drawn by the external team of three experts who were invited to screen a considerable number of videos uploaded was that the participants improved their skills in video recording, especially in talking in front of a camera. Their self-expression skills were judged to have improved significantly and to have become clearer towards the end of the pilot. With the possibility to create their own videos and to present these to a wider audience via the ComelN online community, they were stimulated to practise their ICT competences by having to handle technical obstacles which occurred from time to time and working out solutions alone, with friends or with the help from moderators. According to the moderators, the level of frustration tolerance (i.e. the individual ability to handle frustrating moments) was surprisingly high in comparison to other situations where the young people had to face challenges.

In the interviews with the participants of the Vienna pilot, 10 out of 24 young people admitted that they had asked for help with taking a video or uploading it to the ComelN platform. Six of them had received support from their moderators at the youth institution, three from their best friends and one from his family. The other 14 participants underlined in their interviews that they had not needed any help from others and that the access to the ComelN platform had been easy and intuitive.

Compared to other activities on the platform, the reaction to challenge videos in form of uploading answer videos was somehow limited. Nevertheless, the analysis of the answer videos uploaded as well as the interviews and focus group discussions reveal that self-reflecting processes had been stimulated in the community as participants talked about their experiences and the challenge to reflect on issues of what to reveal about oneself and also what might be of interest for others. According to the moderators, communication skills and self-esteem among some participants improved during the pilot and some got encouraged because of their participation in the pilot. Mirko, for instance, was known as a rather passive young person who was difficult to engage. However, on the platform he was the one to upload the most videos and the youth workers noted that in group activities at the youth organisation he also became more active.

Through the challenge videos and the use of the ComelN platform the communication between the moderators and the young people was strengthened and it helped them to understand them more deeply and how they were able to support them better. The participants had the chance to learn not only from the feedback



of the moderators but also from their peers, who gave helpful comments on the platform or during several formal and informal meetings.

Apart from learning to produce videos, the participants had to respect the common netiquette on the Comeln platform. The netiquette consisted of ten rules, such as respecting the privacy of others or encouraging others to participate. These rules regulated the communication and interaction on the platform and ensured a safe and valuable online environment for all participants. The participants had to reflect on their own contributions – video, text-messages, and group creation – and whether they adhered to the agreed netiquette.

After the pilot, 20 out of 24 interviewed young people stated that they could imagine studying with videos. Although some showed a critical attitude towards learning on a mobile phone instead of learning in traditional learning settings, at the same time they were quite open towards this way of learning. The video format was easy to understand and for some of them it was much easier to listen to somebody instead of reading content. They found the video format engaging as it combines learning aspects with entertainment. The other four participants were still quite sceptical about this kind of learning. The experts observed in the video analyses that the mobile phone as an inherent element in the daily life of most participants had become a tool for learning, communication and self-expression.

## **6 Conclusion, limitations and recommendation**

Mirko and Daria both enjoyed taking part in the Comeln pilot as they found a way of expressing themselves as well as an additional and protected zone for communication and the exchange of ideas with peers and with the youth workers.

The results suggest that the intervention based on the media convergence of «mobile phone», «online community» and «video» as media format among marginalised young people has been successful in terms of skills improvements on the part of participants in all three dimensions analysed, i. e. interaction, creative expression and self-organisation, although a longer pilot to measure long-term effects is necessary to validate the results. Particularly, for the measurement of changes in soft skills a longer observation period is required. Our study has also confirmed that a community needs time to evolve and that an established sense of the community further stimulates the creation of self-generated content among its members (cf. Preece & Maloney-Krichmar, 2003).

Although the pedagogical approach had been well prepared and had been worked out in an interdisciplinary team, the technical implementation in the form of the video-ping-pong-structure was somewhat limited which made it difficult at times for participants to identify challenge videos. Thus, on a platform that is based on the video-ping-pong approach a much clearer structure would be needed. Furthermore, an institutional implementation would guarantee sustainability of the intervention. It could be taken up by youth organisations working with margina-

lised young people or in labour market measures but also the adoption in a school environment is possible. It could serve as preventative measure for at-risk learners who might drop out of school. Thus, the mobile learning-based intervention could be adopted to further contexts and learning environments. However, in any institutional implementation training of secondary users, such as youth workers or school teachers, including the handling of the technology and their role as moderators on the platform, is key.

The video-ping-pong approach could be applied to different learning aims, for instance, to discuss topics and to learn from each other. Thus, the platform supports collaborative leaning where some pupils could act as peer facilitators.

Furthermore, the Comeln platform addresses more than one sensory channel, as it combines textual with audiovisual material. The actual shooting of videos requires tactile-kinaesthetic perception and handling of objects and thus it supports different learner types. To have a virtual stage fostering personal creativity and self-expression might have a stimulating effect and provoke positive learning experiences with flow character (Csikszentmihalyi, 2008). According to this notion, in a stage of flow, people are fully immersed in their activities and experience deep enjoyment, creativity and complete involvement with life. When people experience flow their attention is completely focused and the working or learning procedures themselves are sufficient as sources for motivation, no external motivators are required. Introducing the mobile learning platform and community to a school environment would imply to «break through» the walls of classrooms as the community would not have to be confined to the pupils of one class but could comprise whole schools or even schools in different countries. Specific groups within the community could be created to discuss specific experiences such as excursions that could be shared with others.

The ideas discussed above show the potential of further work with marginalised young people and the flexibility of the platform and the video-ping-pong approach allows for implementation in different learning scenarios, settings and aims.

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## **A Case Study of Mobile Learning in Teacher Training – MENTOR ME (Mobile Enhanced Mentoring)**

Adele Cushing

### **Abstract**

*With announcements such as «more than half the world own a cell phone» (Lefkowitz, 2010) plus the convergence of multi-media elements in handsets, it is perhaps not surprising that education is calling for an increased use of mobile phones to support learning (Hartnell-Young & Heym, 2008). Phone use will contribute to cost efficiencies by subsidising IT budgets (Yorston, 2010) and support personalised learning and students' underpinning knowledge. However, the reality is often «blanket bans» on mobiles in schools (Hartnell-Young & Heym, 2008) due to teaching staff who are nervous of possible disruption and uncertain of pedagogic application. MENTOR ME (Mobile Enhanced Mentoring) was a pilot project with 20 teacher training students at Barnet College, North London. The limited time available to mentors and trainee teachers to engage in mentoring was solved by providing all students and mentors with email-activated mobile phones for ease of communication and support, facilitating situated learning (Naismith et al., 2004). Face-to-face meetings were partially replaced by capturing students' formal and informal learning with mobile functionality. This was shared with peers, tutors, mentors and lesson observers to further improve the mentoring and teaching experience. Self-reflection, peer assessment, peer support and idea-sharing contributed to improving trainees' practice and employability. In addition, teachers' confidence and ability in using technology improved, particularly in supporting learning and underpinning knowledge. The success of this project has influenced the organisation to adopt mobile learning across the curriculum by facilitating student use of personal devices.*

### **1 Introduction**

The teacher training paradigm for Schools and Further Education (FE) in the UK is based upon social constructivist theory (Quality Improvement Agency, No date), co-operative and experiential learning, providing trainees with tasks and activities to underpin and reinforce knowledge. FE lecturers are encouraged to lead by example and disseminate role model delivery ideas to trainees. The increased ubiquity of mobile technology, its converging media of voice/video recording and internet access, has contributed to m-learning being ideally placed to facilitate

personalised learning since a multimedia device can be customised to all user requirements (Traxler, 2010). Mobile learning is a new concept to many lecturers and is defined by its affiliation to mobile phones and gaming technologies as well as supporting learners on the move, i. e. in non-traditional learning environments (Sharples et al., 2009). In Barnet College, 20 teacher trainees and 7 mentors were provided with mobile phones to facilitate continuous communication and support, as well as enabling them to try mobile devices in classroom-based teaching and learning. This case study details background research surrounding mobile learning and describes the methods undertaken to evaluate practice within teacher training. Results come from both participants and devices, contributing to implications for practice. Discussion involving issues of continuity and sustainability leads to a conclusion of expectations for future practice.

## **2 Background**

The Mobile Learning Network (MoLeNet – [www.molenet.org.uk](http://www.molenet.org.uk)) has funded opportunities for the FE and the Skills Sector to engage in mobile learning through large and small-scale projects in the UK since 2006. Its work builds on research by Naismith et al. (2004), JISC (2005) and conferences such as Handheld Learning (<http://www.learningwithoutfrontiers.com/>). By allocating funding, providing project support with access to Mobile Mentors and setting up MoLeNet Academies they have enabled a functional community of mobile learning practice (see also Lave & Wenger, 1991). Schools, too, have been involved in pilot projects, overseen by the local authority. The British Education Communication Technology Agency (BECTA) recommended gradual change for whole school adoption (Hartnell-Young & Heym, 2008).

Barnet College is a large and highly successful North London Further Education college with around 12,000 students of all ages from 14 years upwards. Its programmes include courses categorised as 'good' with 'outstanding' features by OFSTED inspectors. In 2010, staff and teacher trainees were funded by a small MoLeNet project and piloted the use of mobile devices, to assess their value for mentoring, communication and learning prior to moving into newly built premises. The aims of the project were established through conversations between the E-Learning and Teacher Training Managers. Naismith et al. (2004), as featured in Wishart's (2009) research into 'Mobile Technology for Teacher Training', identify informal and lifelong learning and learning and teaching support as key features of mobile learning. The learner-centred mentoring project built upon these elements, encouraging reflection and critical thinking skills. Unlike Wishart's cohort, the teacher trainees were based and taught at Barnet College, only two students had teaching practice in alternative colleges. However, due to the College having dispersed sites, students encountered similar problems of mentoring support

to those of Wishart et al. (2007) where internet enabled PDA's (personal digital assistants) were provided to bridge the communication gap encountered through dispersed geographical locations.

The primary objectives of the project were to:

- facilitate an efficient and effective mentoring process in teacher training
- improve communication between mentors and mentees
- introduce the concept of mobile learning to the teacher training curriculum,
- inspire trainees to adopt mobile learning pedagogy in their own teaching and learning delivery.

Full details can be found at [www.molenet.org.uk/projects/southeast/barnet/](http://www.molenet.org.uk/projects/southeast/barnet/).

### **3 Methodology**

Twenty trainee teachers from a variety of subject areas, seven mentors and seven project leaders/support staff were provided with different types of smartphones (Samsung and HTC XDA) and iPhones. The iPhones were only given to the project leaders because phone calls could not be blocked and the project did not wish to incur additional costs to the 15GB data contract, supplied by O2 and pre-paid for 24 months. Participants in the project aged from 18 to 50 plus and possessed a range of IT capabilities from basic to advanced. It was hoped that all would engage in the project to support their personal methods of working.

Once the devices arrived there was a need for organisational support for system implementation; leadership from senior and curriculum management; curriculum peers; the Learning Centre and technical support. Project participants borrowed mobile devices from the Learning Centre and received technical support from its staff. The MoleNet community recommended that loan policies should state that if devices went missing the borrower should ensure that a crime number was obtained from police. It was also quickly identified that project participants must remember their PIN code for SIM locks, as blocked SIMs incurred an additional cost.

The trainees were introduced to mobile learning during a lecture prior to the distribution of devices. This provided an opportunity to educate them regarding the potential for their own practice and mentoring. The lesson during which phones were distributed hosted a round robin of activities including:

- setting up devices to receive college email and wireless connectivity
- demonstrating how the devices could be used for teaching and learning, e.g. YouTube clips, voice recording/filming work
- sharing captured work with others via email, Bluetooth or ActiveSync

Mentors were also provided with similar support and training. In addition, the Learning Centres (Library Services) were involved in supporting individuals should they need further technical help.

Monthly reports were received during the project and support organised in response. The teacher training lecturer was instrumental in encouraging the sharing of good practice in weekly classroom experience and, as lesson observers, two of the project leaders also played key roles in promoting and demonstrating the use and potential of the devices in their own and others' practice.

Qualitative results were captured by telephone interview, observation and short emailed reports of user experience. Quantitative results were obtained by retention and achievement data as well as an online survey completed by a third of the project participants.

## **4 Results**

### ***4.1 Trainee Teachers, Mentors and Project Leaders***

The round robin of activities gave all project participants an insight into how they could use the device. However, it was important to provide additional individual help through the Learning Centres as a point of reference for further help and support. Email-enabled mobiles provided trainees and mentors with an additional form of communication. Lesson observers were able to video, report and record via their devices, while reviewing work with trainees. Of the 20 students enrolled on the programme, two unfortunately left due to ill health but 100 per cent of retained students successfully progressed to Year 2 of the course. Traditionally these students work as full or part-time lecturers while training and time is at a premium. However, the majority of students engaged with the project and agreed it enhanced the mentoring process and their own teaching and learning practice. In comparison with Wishart's (2009) findings, trainees felt supported by personalised learning facilitated by the email capabilities of their devices as they were able to «keep in touch with email from my mentor and the College». Indeed, mentors and mentees regularly emailed, either from their phones or computers.

Flexible one-to-one support sessions were provided on a routine basis when the lecturer required it; however, fewer were required and time saved was re-invested into the course, providing students with regular high quality teaching and learning support experiences.

Of the 20 devices provided, only one student asked to change the model. This was in order to use it with his own SIM card and, as a motorcyclist, to Bluetooth the phone's radio to his helmet. His request was granted on the hypothesis that if he was using the phone for his social experience, he would be more likely to use it with his students. This was proved right since he became a key leader of



mobile learning amongst his peer group. Some other trainees did not use the phones provided by the project, preferring to use their own due to capability and familiarity.

The pilot introduced the concept of mobile learning to the heart of the teacher training curriculum. Many trainees began using mobile devices with their own students. This immediately increased the uptake of mobile learning throughout the college. One lecturer commented that «students look after their phones more than they do paper based materials», emphasising the benefits of capturing class work through camera-phones (Image 1).

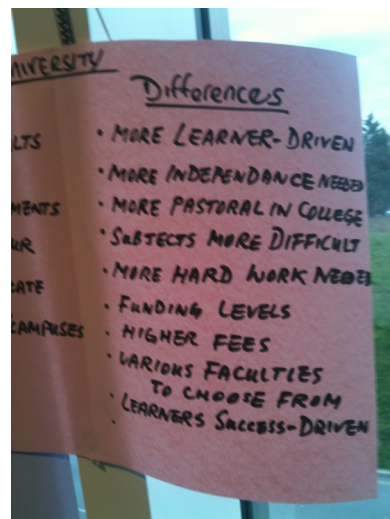


Image 1: Benefits of capturing class work through camera-phones

Indeed, prior to commencing the project, survey respondents indicated that phone and camera features were mainly used by participants, e-mail was least used. At the completion of the project, internet access had become the primary reason for use with email and camera usage a close second. All except one trainee had used their devices to communicate with their mentors, arranging meetings and accessing feedback. The individual who did not use this feature had easy access to their mentor in an office nearby.

One mentor did not have a device at the beginning of the project but the trainee captured voice/video recordings of issues they wanted to address with their mentor when they met.

Seventy-one per cent of teachers surveyed encouraged their students to use their own mobile devices for:

- searching for work placement locations
- providing evidence of their work
- taking voice notes about assignments or homework requirements
- presenting their work.

Of seven survey respondents (Table 1) 100% said they would use a mobile device in the future to support their teaching, only one said they would not purchase a good quality mobile phone to use for teaching and learning. Respondents felt that phones were quicker to access at home or work (they do not take as long to load as computers) and they are easy to carry in a normal bag. The only reservation was the distraction of the internet for students in class but the same comment suggested appropriate research topics will keep learners on task.

**Table 1:** Mobile phone use for teaching

Do you think you will use a mobile device in future, i. e. on your own to support your work?	
Yes	7
No	0
If yes, would you purchase a good quality mobile phone to use for teaching and learning?	
Yes	6
No	1

The majority of project objectives were successfully achieved. In applying mobile devices to assessment pedagogy, trainees used the devices to video record their own lessons, self assess and discuss with their mentors. They photographed class/whiteboard work (e.g. thought showers) and shared with students via the Virtual Learning Environment (VLE). Key discussions with students were recorded as well as assessments in the work placement. This in particular saved a large amount of time in travel and assessment and helped the student teacher to review points made during lessons and assessments. Curriculum Managers have endorsed this practice and it will continue in 2010/11.

Trainees using the devices increased their IT skills and persevered through 'desirable difficulties' associated with learning and the use of new technologies. They discovered they could be creative with teaching delivery and facilitate their own students' use and learning beyond the confines of the classroom, increasing independent and situated learning. Class-based learners were able to research the internet on their mobiles in answer to questions and the completion of group tasks. This enhanced differentiation and contribution to class discussion. A greater number of teaching observations were facilitated through the use of video. Trainees activated video from the classroom so observers did not have to be in the room. The lead tutor was concerned that this process would not be rigorous enough but trainees were very positive as video provided a fair assessment, clearly showing good practice and areas for development. Trainees also felt less stressed

by not having an observer in the room. This method contributed to approximately £10,000 savings in observer time and travel costs.

Reflection and critical thinking skills were enhanced as trainees asked others to film them. They then watched themselves and identified elements of delivery that could be improved. They were able to reflect on their appearance, body and spoken language relating to teaching delivery and felt comfortable working this way. In the long term, enhanced reflection and critical thinking skills will enhance employability as students demonstrate self-improvement in their work.

Observers/Mentors captured critical reflections on teaching and learning through a voice recorder after observations. They also captured elements of good teaching practice and disseminated to staff via mobile email. A recent partner Higher Education Institute's (HEI) 'Outstanding' UK Inspector's report states:

One of the partner colleges is making excellent use of emerging technologies to enhance mentoring support by exploiting iPhone technology to allow mentors to record conversations, photographs and video aspects of their work, thus enabling the instant sharing of good practice as it happens. (Ofsted, 2010a)

Model release forms are necessary for students (especially under 18s) having their image recorded for peer, self, formative or summative assessment. Images and video from college study should not appear on the internet and students should be assured that the use of media is for study/work only. This should be declared in the organisation's IT Acceptable Use Policy for the safeguarding of both students and staff.

#### **4.2 Devices**

Strong WiFi signal in an organisation may mean it is not necessary to invest in a data contract for devices. However, there were reports that the WiFi signal was particularly weak in some college buildings. Consequently it was useful to have the phones' GPS signal to access the internet as required. 15GB of data access may have been an over investment for this project but it was difficult to judge how much data students might download. Some trainees used Wi-Fi at home and college to minimise data contract use and only minor additional costs were incurred.

Multi-media elements converging in one device may mean that it becomes a 'jack of all trades, master of none', for example a camera feature may lack in picture quality compared to a specified digital camera. Voice recordings may also be faint and difficult to hear. The iPhone has good quality video and camera but the voice recording can be faint if not delivered through the speaker. Emailing the

elements often means they get cut or ‹trimmed› if they are too large, perhaps losing essential content. The range of devices was chosen according to the practical requirements of the project. The smartphones were fit for purpose since they had Microsoft Office Mobile software and mentoring documents could be emailed between device/computer. The Samsung particularly was reported by Art and Design students to have a good camera. However, there remained a certain amount of ‹phone envy› from participants who were not given an iPhone, believed initially to be caused by the marketing draw of Apple but this may also be due to the user friendliness of the device:

The teacher training lecturer (<http://tinyurl.com/2fxcx2q>) did not, prior to the project, own a mobile phone, which is surprising since

The idea of a single portable device that can make phone calls, take pictures, record audio and video, store data, music, and movies, and interact with the Internet — all of it — has become so interwoven into our lifestyles that it is now surprising to learn that someone does not carry one. (Horizon Report, 2009)

However, as a novice user the teacher trainer found the iPhone to be intuitive and particularly easy to navigate. The smartphones, by comparison, had ‹clunky› menus and needed a stylus to manipulate them. On reflection, further investment in iPhones could have been possible if savings had been made on the data contract. However, the use of iPhones and evaluation of apps for learning may not have given a real picture of student learning in college since iPhone handsets are comparatively expensive and, as a result, fewer teenagers own them.

On completion of the project some devices were returned for further loans, while others have been kept by practitioners. To date there have been no reports of stolen devices and only one has been damaged. One or two devices had accessories missing on return e.g. chargers, USB cables.

#### **4.3 Implications for Practice**

Qualitative feedback has provided many good examples of mobile learning practice for a variety of curriculum areas. These examples are largely due to the teacher training tutor leading by example. He states:

An indirect effect of having the iPhone has been that I can encourage students to use their phones, so I encouraged one class of numeracy students to photograph their own board work. Another student was so pleased with the pattern of colours created by his work in Maths (using counters for di-

vision) that he wanted to use it for his art project so I encouraged him to photograph and e-mail it to his art teacher.

Other examples are:

- The voice recorder to interview a dyslexic student so he could submit a transcript of the interview as his essay. This, and other tools, enabled the student to pass the Level 5 course when he had previously not progressed from a Level 3 course. (<http://www.moletv.org.uk/watch.aspx?v=CNKNW>)
- The timer for classroom activities.
- The camera for photographing and sharing students' work.
- Live note taking during lesson observations.

His practice was commended by a partner HEI's UK Inspectorate report on subject leaders: «They are expert in using ICT to enliven their lessons and to enthuse learners.» (Ofsted, 2010a) And recorded key strengths as«the excellent use of ICT to support trainees' learning and classroom practice.»

Many trainees' teaching was observed using the devices, understanding the pedagogic potential of mobile devices and influencing cross-college practice. A co-observer was surprised as the teacher passed her mobile phone around asking students' opinion on a video but this way of teaching had become second nature to course participants. One art lecturer used his phone as a camera to project students work so they could evaluate and peer assess (see Image 2). They then took their own photos of work to keep long term.



Image 2: Projecting student work

In addition:

- A trainee teacher's student used her own phone to take pictures of a play area on work placement and this was shown in class. Students working with young people/children are aware that they must not take pictures of children in the play area.
- An English as Second/Other Language (ESOL) lecturer also used the phone's voice recorder to record students and analyse their pronunciation, enabling them to self-assess and improve.
- Vocational lecturers «used the camera & video a great deal when observing students in practicals. We added the images to their assignments for evidence for their practical units.»
- 16-19 year old Mental Health students used their lecturers' mobile device to interview each other on their opinion of their course. This was easier than writing an evaluation. The video clips were also used to shown to their health care professionals (referrers) to evidence what students had been doing.
- Students borrowed lecturers' phones to take notes so they could email them to themselves.
- Mobile devices can plug the gaps of a low student:computer ratio or a power failure cutting off desktop access, further enabling classwork and group activities. However, battery power may be criticised since multi-media devices need increased charging when they are used for long periods of time.

The addition of mobile tools to learning has enhanced inclusion; expected cultural barriers have been broken as mobile phones are a socially inclusive method of communication. Students from all backgrounds have been observed capturing information digitally to refer to at a later date. Ubiquitous wireless access in an organisation also increases access to online resources and materials. Mobile devices are used to meet equality and diversity requirements; all project participants were loaned devices with some being used to meet specific needs e.g. dyslexia and visual impairment. [http://www.moeshare.org.uk/case\\_studies.asp?ID=75](http://www.moeshare.org.uk/case_studies.asp?ID=75)

## 5 Discussion

The success of the project builds upon existing research in support of mobile devices being used appropriately to enhance teaching and learning. This is summarised in JISC's recent literature review on mobile learning (Belshaw, 2010). There is an expectation, particularly in Higher Education, that students wish «to use their own devices with corporately-owned IT infrastructure» (Belshaw, 2010, p. 6) and this is increasingly the case within Further Education. Indeed, in order to sustain personalisation of learning it is desirable that students use their own devices and, since the project challenged the organisation's stance on the use of

mobile devices for learning, this is currently being facilitated. The student code of conduct has been changed at Barnet College to allow students to use mobiles for learning with permission of supervising staff. These devices should be silenced and will obviously not be used during examinations. Web 2.0 sites such as YouTube provide access to many formal and informal learning opportunities and access to these via a mobile contribute to personalised situated learning, facilitating a classroom without walls (Lepkowska, 2010).

However, challenges continue in terms of compatibility between hardware: «unhampered digital communication with peers, tutors and administrators» (Belshaw, 2010) is easier with wireless/internet-enabled devices. Students without data contracts may have difficulty in transferring data by USB from device to computer, depending on administrator privileges. Enabling Bluetooth can combat this but desktop PCs are often not Bluetooth-enabled.

Consideration has been given to e-safety, equality and culture in working with students aged 14 to 18. O2 have a web-filtering project called «Shield» ([http://www.o2.com/about/content\\_standards.asp](http://www.o2.com/about/content_standards.asp)) to safeguard young people in using the mobile internet and this has been applied to devices loaned to under 18s. Unfortunately, this system blocks sites more than it manages access as recommended by Ofsted (2010b). Wireless internet also minimises risk of accessing unsuitable sites since connections are via an organisation's filtered network. E-Safety should be integrated into the use of mobile devices for learning as it is with the use of other forms of ICT (Nightingale, 2010). It can be easier for students to cyber-bully through the use of texting but answering curriculum-related questions via text is also beneficial. The long term aim should be to educate students in the use of mobile devices for learning, keeping them busy, engaged and working together, thereby minimising cases of cyber-bullying. In a recent class the lecturer reported that students using their phones for note-taking were concentrating on the content and not distracted to check for SMS messages, consequently being less disruptive to the lecturer and others' learning.

Some mobile devices may need to be provided for students who do not own one. These students are in the minority but older students in particular are less likely to have a multi-media device. Improved WiFi access means less cost to individuals for internet access and SIM cards are not necessary to use the multimedia features. If devices are offered to students on long term loan they can use their own SIM cards to make the device fully functional with calls and texts. Blackberries are the device of choice for teenagers according to the Guardian (Smith, 2010) due to BBM (Blackberry Messenger), text bundles and a comparatively cheap handset. This has been proved in continuation projects with students aged 14-19. Students

may also have text bundles, enabling them to participate in question and answer sessions via a TextWall (<http://www.xlearn.co.uk/sms.htm>) thereby enhancing the lower/higher order thinking skills described in Bloom's taxonomy.

## **6 Conclusion**

This case study demonstrates the potential impact of small projects on a large organisation. The introduction of mobile devices for learning through the featured project sparked general interest across the college. Staff outside the project attended staff development sessions regarding mobile learning and have been considering how they can utilise their own students' mobile devices to support learning, whether that be timetable and deadline organisation through the calendar or capturing collaborative board work through the camera. Consideration has been given to implementation and student behaviour around mobiles. This behaviour appears to have improved by integrating their use into classroom practice, although there may be concern regarding student groups stealing devices from one another (Hartnell-Young & Heym, 2008, p. 17). In order to be sustainable, mentoring with mobiles requires strong leadership and equal access to mobiles and their multimedia features. Projects continue with students' own devices and the leadership of lecturers will sustain success rates.

Students do not expect technology «to be used as a crutch for poor learning and teaching experiences» (Belshaw, 2010, p. 6). This project has proved the worth of mobile learning in and out of the classroom, for personalised and group support comparative with Wishart's (2009) research. However, findings also demonstrate that mobile devices are an additional tool for learning and should not be solely relied upon. Differentiated teaching methods remain important and lecturers should evaluate their own groups, i.e. behaviour management and access to devices before embarking on use of mobile learning with a whole class.

Curriculum development is another consideration as colleges prepare students for the commercial world. The prominence of IT businesses such as Intel, Apple, Microsoft is being replaced with those of Creative Digital and Information Technology (CDIT) businesses like Google, Amazon and Facebook, all of whom now have an efficient mobile presence. Consequently our students need to remain competitive with relevant skills in a changing work environment.

## **7 Links**

Outputs on MoleTV –

<http://www.moletv.org.uk/Default.aspx?module=AllMovies&Org=67>

Case Studies

<http://moleshare.org.uk/search.asp?k=Barnet+College&z=0&s=0&Page=1>

Video evidencing – <http://vimeo.com/11357181>



Voice recorder – <http://vimeo.com/11357154>

Camera to capture notes – <http://vimeo.com/11357154>

Qik – <http://vimeo.com/11357154> (Log in with password: barn3t)

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## Leading by the Hand

### Exploring the factors affecting individual student engagement with self-directed mobile assessment

Ceridwen Coulby and Nancy Davies

#### Abstract

*This paper examines the role of the individual student and his/her engagement with self-directed mobile assessment. The findings presented in this paper are based on the results of the ALPS (Assessment and Learning in Practice Settings) CETL (Centre for Excellence in Teaching and Learning) programme, a 5 year examination of the use of mobile technology for interprofessional, formative, work-based assessment among health and social care students. Analysing the results of multiple focus groups across a number of health and social care professions we found that learner engagement with self-directed mobile assessment is dependent on internal and external factors. In this paper we explore the internal factors, namely that of learner goal, confidence and stage of self-direction (Grow, 1991).*

#### 1 Introduction

Should mobile technology be used in education, and if so where? What are the pre-requisites for ensuring mobile technology «works» for education? In this paper we explore the use of mobile technology for self-directed learning and assessment and consider the pedagogical preparations required by students and education providers to implement such initiatives. We hope our article, reflecting on the role of the individual in mobile learning, provides an interesting perspective on the educational and conceptual frameworks underpinning the use of mobile technology in educational settings as highlighted in this special issue.

We believe that in a world where technology is interwoven into the fabric of our lives and mobile phones are ubiquitous, it is strange not to use mobile technology within formal education. Higher Education providers have a responsibility to enhance students' employability skills wherever possible; using mobile devices during work-based placement is a good introduction for students to using this technology in a work context. The value of mobile technology within healthcare settings for work purposes has already been acknowledged (Sandars and Pellow, 2006) and its use on work-based placement provides an opportunity for the student to make the transition between the use of mobile devices for social and personal use to work related usage.

Moreover, mobile technology presents education with many opportunities. It provides possibilities to customize and individualise learning opportunities for students, (Sharples, 2000, Kukulska-Hulme and Traxler, 2005, Ally, 2009) thus involving students as partners in their own education (Bruns et al., 2010). Education providers have a chance to engage with students on their terms; allowing the student to find ways to devise meaning-making and increase their motivation to learn concepts that previously may not have interested them (Pachler, Bachmair and Cook, 2010).

In 2004 a Centre for Excellence in Teaching and Learning (CETL) was funded by the Higher Education Funding Council for England to examine and improve the work-based learning experiences of health and social care students. The aim of the Assessment and Learning in Practice Settings (ALPS) CETL was to increase competence and confidence of the students on graduation. Previous studies had shown that students often do not feel prepared for practice; and this has serious implications for employers and graduates in their first year of working (Goldacre, 2003a, Goldacre 2003b).

In 2006 ALPS bought 900 mobile devices to distribute amongst whole cohorts of students and staff from a variety of health and social care professions. These were for the purpose of completing formative interprofessional assessments created by ALPS based on the ALPS common competency frameworks of team working, communication and ethical practice. The tools encouraged students to engage in self assessment; but also to gather feedback from work-based assessors, service users (patients) and peers. For an example of the assessment process please see Figure 1.

**Figure 1. The student-led mobile assessment journey**

The student identifies a learning opportunity; perhaps they have had a complex or unusual encounter where they would value feedback.

e.g. Occupational Therapy Student performs an initial assessment on a patient with an eating disorder in the patients room.

The student must check with their practice assessor if they wish to gain feedback from a service user (patient).

e.g. The student asked a practice assessor for permission to complete the assessment and interview the service user (patient) in her room. The assessor agrees but asks the student to have a nurse present.

The student conducts the assessments with the relevant people and also completes a self assessment section.

e.g. The student carried out a self assessment and also a service user(patient assessment).

The student then completes an appropriate action plan discussing it with their practice assessor if they wish

e.g. The student decides to pre book a room for the next appointment to avoid invading the service users (patients) personal space

Once the assessment tool has been completed it is uploaded to an online portfolio area where the student can then discuss further with their university based tutor if they wish

This is inline with O'Malley et al.'s (2003) definition of mobile learning as:

... any sort of learning that happens when the learner is not at a fixed, predetermined location, or learning that happens when the learner takes advantage of learning opportunities offered by mobile technologies.

Both parts of this definition apply to the ALPS programme as the students were out with the University, rotating around a huge variety of placement locations using a PDA to complete assessments and access learning materials.

## **2 Self-directed Learning**

Mobile technology on its own is ideal as a tool to facilitate self-directed learning and, therefore, learner responsibility as it puts the responsibility for learning directly into the hands of the student. However, coupling this digital freedom with formative assessment allows the student a much greater choice in deciding when, how and from whom they gather feedback.

The purpose of formative assessment is to use the feedback gathered to direct future learning, i.e. to identify and plug gaps in knowledge and skills (Black and Wiliam, 1998). There is evidence that formative assessment encourages learners to take responsibility for their own learning (Nicol and Macfarlane-Dick, 2006). Therefore, we hypothesised that providing students with mobile devices upon which to complete assessments and access learning material would encourage them to become more self-directed in their learning on placement. There is evidence that self-directed learners achieve higher grades within formal education (Shin, Haynes and Johnston, 1993) and are more able to cope with the demands of continuing professional development in later life (Candy, 1995).

By implementing this initiative we were effectively asking students to take on the responsibility of becoming self-directed learners, to identify their own areas for development and assessment opportunities for the purpose of increasing their confidence and competence without any summative requirement to do so.

Defining self-directed learning is complex; in this paper we will be using Malcolm Knowles definition of self-directed learning as a process:

... in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes. (Knowles, 1975, p. 18)

The process outlined by Knowles has its critics; it is approached in a linear way (Merriam and Cafferella, 1991) which does not take into account the different contexts in which learning can occur. For example, learning can result from

experiences in action (Schön, 1983) that may trigger a learning project (Dewey, 1938) rather than be a pre-planned activity as in Knowles' work. As our students are reliant on what happens in the workplace to provide learning opportunities through which to complete assessments from a limited range that we have set, we seem to fall short of Knowles' definition of self-directed learning; however, no learning takes place outside of a context. Our experiences are what drive us to want to learn new skills and we cannot separate our life-worlds (Pachler, Bachmair and Cook, 2010) from learning.

The second issue with Knowles' approach is that it does not acknowledge the level of environmental control the learner has over implementing a solution to their self determined learning needs. In our case, students are subject to the politics, policies and practices of the workplace, where access to learning opportunity is considerably variable (Fuller and Unwin, 2004).

Despite these criticisms, the process outlined by Knowles of learners taking the initiative to identify, implement and evaluate their own learning matches the ethos of preparedness for professional practice that the ALPS programme promotes, and, within our specific context of formative assessment of core competences in the workplace, this is exactly what we want the students to do.

The long-term benefit of becoming self-directed, and therefore lifelong learners, is evident for health and social care students who are required to take personal responsibility for the updating of their skills and knowledge throughout their professional lives; in the short term, student responses vary significantly. Therefore, why do some students engage with self-directed learning while others do not?

### **3 Methodology**

#### **3.1 Case study – Training students in self-directed mobile learning**

The formative assessments ALPS asked the students to complete were: knowing when to consult or refer, working interprofessionally, gaining consent, demonstrating respect for service users and carers, and providing information to a colleague; these are all scenarios encountered by the 16 health and social care professions involved in ALPS. Each of these assessments had 4 different sections that the student could choose to complete. A self assessment, peer assessment, practice assessor assessment and service user (patient) assessment. 125 students from Medicine, 32 from Diagnostic Radiography, 40 from Occupational Therapy, 50 from Speech and Language Therapy, 22 from Dental Hygiene and Therapy and 40 from Physiotherapy, 3 from Social Work were given ALPS assessments on mobile devices.

Due to the enormous number of potential assessors involved in the completion of ALPS assessments (service users/patients, carers, peers and practice assessors) we

realised that the only practical way to ensure that the process was a success was to make it student-led. This meant that the students were completely responsible for the entire learning process, from identification of an assessment opportunity to evaluation and action planning. Thus, the students were taking on a significant part of the role of the teacher. This brings with it pedagogical, ethical and practical considerations and requires a fully integrated teaching and training solution. We called this the students as teachers programme.

Each student attended a training session lasting approximately one and a half hours, though this varied dependent on timetabling and course structure. The session was devised to present both the pedagogy and the technology as seamlessly combined. We could not assume a level of competence or awareness of reflective practice or technical ability so we designed a training programme that incorporated not only how to use the technology, but a protocol for its use in clinical settings and an overview of learning preferences to consider when demonstrating the use of the mobile device (see Figure 2). The students were required to role-play an assessment scenario and demonstrate the use of the device prior to the end of the session.

During the session students were asked to attend a focus group following their placement to report their experiences of using self-directed mobile assessment in a work-based setting.

#### Figure 2: Outline of training available from the ALPS Trainer Handbook

##### **Training packages available include:**

- An introduction to the purpose of ALPS (slides)
- Basic PDA functionality training- Quick Guide to the PDA (slides)
- More advanced PDA functionality training- Getting the most out of your PDA (slides)

##### **Assessment Suite training including:**

- Assessment tool guide (video and/or handout)
- e-portfolio guide – for both mobile and online assessments (video, handbook and/or live online demonstration/practical if in computer cluster)
- Guide to using the PDA in practice (handout and/or slides)
- There is also a comprehensive e-learning module that can be used to cover all aspects of the ALPS training. This can either be completed in the classroom setting in an IT cluster, with tutor or lead present to answer any questions, or at the student's convenience.

A typical ALPS training session should consist of:

1. An introduction to the purpose of ALPS
2. How and when the mobile devices and/or tools will be used in the context of their placement/programme of study
3. A clear expectation of how many assessments students are expected to complete and how often tutors will check and respond to assessments within the e-portfolio
4. One of the PDA training packages if using mobile devices
5. Assessment suite training
6. Explanation of protocol for use of PDA and assessments in practice settings
7. Questions

### 3.2. Students' response to training

Following training students were asked to volunteer to attend focus groups to share their experiences of mobile learning and completing assessments in practice. Focus groups were held following the completion of each placement with representatives from each profession.

On the whole most students liked the training that was given and the accompanying documentation

Oh I thought it was really useful, it was quite clear, really clear and going through everything. And the instructions were quite clear and didn't – even going through it once I had a good idea of what to do so, I tried it (Student 1)

... all the instructions and stuff like that are good [group agreement] ... and the information (Student 2)

However, for some students there was a variance in how they felt about the training, even within the same training session! These two students attended the same training session and these are their responses:

...had the device just chucked at me ... (student 3)

...handouts are clear and explained everything well ... (student 4)

What we must ask is why did two students have such different responses to the same experience? As both students were treated in the same way and received the same level of training this difference in response can only be due to the individual student's attitude toward the concept of some aspect of self-directed mobile delivered formative assessment or their understanding of this process.



Whilst we acknowledge that other possible influences effect student response; for example the role of technology in the student's life, their digital confidence and beliefs regarding appropriate use of mobile technology (Sharples, 2006) we believe that deeper explanations lie in the student's attitude towards learning and responsibility; their «readiness» or ability and motivation to be self-directed (Guglielmino, 1997).

Whilst Knowles (1984) has a defined notion of the self-directed learners attributes, how a learner achieves these characteristics is less well defined, there is an assumption that as young people mature into adults their ability to learn independently and become self-directed learners matures along with them. However, it can be argued that learning is situational (Lave and Wenger, 1991). For example a student can be self-directed when gathering and selecting relevant information to craft an essay, but very dependent when on work-based placement. Grow (1991) offers the notion of stages of self-direction in his staged self-directed learning model (SSDLM) (see Figure 3). The learner moves (or does not move) through the stages as they develop knowledge and skills. It is possible to be a stage 1 learner in one subject and a stage 4 learner in another due to the situated nature of learning. Grow states that he makes certain assumptions in his model, for example that there is nothing wrong with being a dependent learner (though he does note it can be a serious limitation) and that self-direction can be taught. Is this in fact the case? Are there learners that remain dependent learners all their lives? Surely, if learning is context specific no-one can remain dependent all their lives in all areas? Can self-direction be taught, or is it in fact reliant on personal characteristics? (Brockett and Hiemstra, 1991).

Additionally there must be some underpinning conditions required for learners to learn at all, infrastructures and minimum requirements, which are not acknowledged in the model. Spears and Mocker (1984) in particular emphasize the importance of learner environment as a condition affecting self-directed learning.

On the face of it the model can be seen as an over simplification of what is in fact an extremely complex combination of variables including learner dispositions, environmental circumstances and politics, however it sits well with the literature on apprenticeship where a staged approach to the development of professional skills and attitudes is often used (Lave and Wenger, 1991; Billet, 2003; Collins 1989).

Additionally the potentially linear appearance of the model is counteracted as in fact Grow acknowledges that learners can move between stages and regress under certain circumstances. It is also important to note that stage 4 learners do not necessarily have complete control of their learning; in formal education frameworks and choice are provided (Guthrie et al, 1997, Temple & Rodero, 1995).

Figure 3: The staged Self-directed Learning Model- Grow, 1991 p. 129

<p><b>Stage 1:</b> Learners of Low Self-Direction</p>	<p>Dependent learners need an authority-figure to give them explicit directions on what to do, how to do it, and when. For these students, learning is teacher-centered. They either treat teachers as experts who know what the student needs to do, or they passively slide through the educational system, responding mainly to teachers who «make» them learn.</p>
<p><b>Stage 2:</b> Learners of Moderate Self-Direction</p>	<p>Stage 2 learners are «available». They are interested or interestable. They respond to motivational techniques. They are willing to do assignments they can see the purpose of. They are confident but may be largely ignorant of the subject of instruction. These are what most school teachers know as «good students».</p>
<p><b>Stage 3:</b> Learners of Intermediate Self-Direction</p>	<p>In this stage, learners have skill and knowledge, and they see themselves as participants in their own education. They are ready to explore a subject with a good guide. They will even explore some of it on their own. But they may need to develop a deeper self-concept, more confidence, more sense of direction, and a greater ability to work with (and learn from) others. Stage 3 learners will benefit from learning more about how they learn, such as making conscious use of learning strategies.</p>
<p><b>Stage 4:</b> Learners of High Self-Direction</p>	<p>Self-directed learners set their own goals and standards-with or without help from experts. They use experts, institutions, and other resources to pursue these goals. Being independent does not mean being a loner; many independent learners are highly social and belong to clubs or other informal learning groups.</p>

It is possible that the student's stage of self-directedness (for example stage 1) is one variable that dictates the student's response to the concept of conducting ALPS mobile assessments. This and other possible explanations are explored in the results and conclusion section of the paper.

## 4 Results

### 4.1 Student responses to using self-directed mobile formative assessment during work-based placement

We have established that the students' perception of training can vary considerably. However, it wasn't until students were actively engaging in this process that their ultimate experiences and attitudes were realised.

The focus groups we held following student placements were audio recorded and transcribed. The transcripts were analysed using thematic analysis. Whilst the majority of feedback was concerned with practical issues, there were always extremes of experience- students within the same profession and learner group

loved the assessments, or hated them; they liked the mobiles, or thought they were a waste of time. Due to this wide variety of responses it became apparent that the individual learner and their personal experiences were key variables within the acceptance or otherwise of self-directed mobile assessment. Therefore, we examined this further and determined an overarching set of concepts that influenced the take up of self-directed mobile assessment. These are the themes we identified as relevant to this article.

- The effect of learner goal on engagement with self-directed mobile assessment.
- The effect of SSDL stage on engagement with self-directed mobile assessment.
- The relationship between self-directed mobile assessment and student confidence.

#### **4.2 The effect of learner goal on engagement with self-directed mobile assessment**

A potential factor affecting the uptake of self-directed mobile assessment is the goal of the individual student.

We were just really busy all the time there was no time for that and it didn't really serve any purpose, any meaningful purpose to me or to them. (Student A)

This student's goal is to pass the placement, a basic, but imperative goal for all students. The student has made a value judgement regarding the process, despite tutor advice. This is probably because the benefits of completing the assessments are not immediately obvious.

Student B's goal is to improve their skills and working practices. They have seen the value in the assessment process. This does not mean that the student is not also concerned with passing the placement; but they aim to achieve a wider set of goals compared with student A.

... we have to compile a CPD folder I think it would be really good to add to your reflective pieces erm to show how service users view you as a t\* (profession)(Student B)

Student B is considering themselves as a professional, looking beyond the placement experience to a time when they will be personally accountable to service users (patients).

Personal dispositions (Perkins, Jay and Tishman, 1993) play a role in learner goals, their educational background, cultural norms and values and the life-worlds (Pachler, Bachmair and Cook, 2010) to which they belong to all shape how they feel about learning and their pre-disposition to self-direction (Brockett and Hiemstra, 1991). Student A is not necessarily at a lower stage of the SSDL model than student

B. It is possible to be at stage 4 of the SSDL model and actively choose not to engage in formative assessment but to focus on summative assessment. Both types of learner in this example have different ultimate goals; and these goals clearly have an influence on the uptake of self-directed mobile assessment. Whilst this is not an issue in itself, potentially student A may feel less prepared for practice on graduation due to their linear approach to their studies.

#### **4.3 The effect of the SSDL stage on engagement with self-directed mobile assessment**

The student's stage of maturity within the SSDL model has a direct effect on their engagement with the mobile formative assessments. The focus of the assessment is to gather feedback, helping the student improve their skills in a safe environment. However, here we see a student that clearly sees the assessments as just something else to do on placement, a tick box exercise.

I was doing the assessments I was getting into the swing of it but the questions there's too many that needs shortening because I think that will probably win people over as well because then it's not as time consuming because I did quite a few and I was knowing what was coming next but it's still that seem to be asking the ins and outs of things that I don't know whether a tick box would be quicker just to do you know what I mean (Student C)

If a student does not engage properly with the assessment, it negates the purpose of the assessment. This is an example of a stage 1 learner from Grow's SSDL model: dependent on the teacher's instruction. They have completed the assessment, because they were told to, without actually understanding the aim of the process. The student has highlighted physical obstacles i. e. number of questions and time taken using the device, as a barrier to use but have failed to see any value in the assessments above and beyond the practical issues. A better understanding of the importance and value of the assessment may have altered their perspective on and patience towards the physical issues of using the tools as demonstrated in the MEDS evaluation of using mobile devices with students with disabilities. (Dearnley, Walker and Fairhall, in press)

This type of student is likely to experience the most difficulty and anxiety in completing assessments as the assessment process involved identifying a learning opportunity. Identifying appropriate assessors and reflecting on feedback critically require a stage 3, intermediate level of self-direction. Without a supportive and directive assessor, these students cannot hope to benefit from the assessment in the way it is designed to be used, and the assessments just become another task that the student has to complete on an already busy placement, potentially

jeopardising the student's ability to learn the key lessons from experiences. In this way, the assessments designed to promote self-direction and ultimately confidence and competence could actually prove detrimental, and result in the exact opposite- unconfident, incompetent students.

In contrast here we can see a student at stage 4 respectively of the SSDL Model. This student has recognised the personal responsibility for learning required from them, they have identified that they have a choice in how they use the assessments to best aid their development.

The process of reflecting all the time is important; it is good to have something which makes you do it more often. (Student D)

Whilst it is right that young people take more responsibility for all aspects of their lives as they mature, the level of responsibility we can reasonably expect from all students is less straightforward. In this example we can see that the stage 4 learner is planning for the future and will likely achieve their goals. But what of the more dependent stage 1 learner who can't see the point of formative assessment? In the conclusion we will consider how we can support these early stage learners to engage with the process and ensure they have as equitable a student experience as their more mature self-directed colleagues.

#### **4.4 *The relationship between self-directed mobile assessment and student confidence***

A degree of confidence is needed to try the self-directed mobile assessments initially, as the student is required to pro-actively approach others for feedback. Not all students felt comfortable doing this.

... anything that takes longer than filling out forms is just going to annoy them. You feel like you are just tip-toeing around. (Student E)

Some students took what they saw as a less threatening route by approaching peers for feedback initially. Even though the assessments were formative and would not, therefore, affect their ultimate summative grades, the students perception of their practice assessor was tied to this summative grading. Therefore, getting feedback from peers was seen as preferable.

I think a benefit is probably feedback is less threatening in a sense like when if your educator sort of says you kind of think is that going to affect my grade is that where as the peer assessment they can always pull you on the side

and go I did noticed you know what I mean so I think there is a lot of benefits to it (Student F)

This student feels more in control of their learning when they have a choice of who to approach and when. For this student, assessor-led assessment is more daunting than student-led. Is this to do with timing? In this case the student chooses whether they are «ready» to complete an assessment; it is not at a dictated time. Alternatively, is it because the assessment is with a peer and, therefore, a «safe» assessment?

#### **4.5 Other factors affecting up take of self-directed mobile assessment**

We cannot, of course, ignore the external factors influencing the student uptake of self-directed mobile assessment. Several students encountered resistance to the use of mobile phones in healthcare settings and some were flatly refused when they asked to use them. This could be a historical cultural resistance based on past legislation where mobile phones were banned in hospitals for fear of interference with electrical equipment (a fear largely disproved by the Department of Health report of mobile phones in hospitals (DoH, 2009) or due to the more patient centred concerns such as dignity, confidentiality and ethics which still remain policy concerns. The resistance could also be due to concerns regarding professional image: health professionals may feel that patients would perceive them to be rude or not concentrating on them if using a mobile device during a consultation. Whatever the reason, the powerful influence of the learning environment and practice assessors therein on the learner cannot be underestimated. Whilst out of the scope of this article we intend to consider the external influences on learner take up of self-directed mobile assessment in future work.

### **5 Conclusion**

Does mobile technology empower students to become more self-directed in their learning? We would argue that mobile technology provides the opportunity to facilitate self-directed learning; but that take up is dependent upon several factors. Underpinning everything is the student's understanding of their role within learning: do they accept they have an active and influencing role in the process? (Taylor, 1995)

In addition, the student's individual goals, their stage of development on the SSDL model and confidence to approach others for feedback initially all affect student uptake and engagement. In this way more confident and developed learners seem to get far more out of the self-directed mobile assessment process than their less confident counterparts.

What we must ask ourselves is, is this ethically sound? By introducing such innovative processes are we creating a digital and pedagogical divide?

Training is a possible solution with which to address this potential divide; but the content is vital. It is not enough to train students to use mobile technology and provide them with pedagogical reasons for doing so. We must also consider the implications of mobile technology: it necessitates a degree of self-directedness. Lowry (2006) makes several suggestions on how to facilitate self-directed learning including helping the learner to recognise the initiating point for a learning lesson and teaching needs assessment techniques. These two suggestions would add significant value to our future training programmes. Lowry also identifies the need for students to appreciate that they can act on the world and change it, which is a key paradigm shift for many learners.

Another potential solution is peer support. When training students it was clear that there was greater group engagement in the process when those who were less mature or confident had the opportunity to learn from and alongside those students who 'got' the process. This reflects Assinder's (1991) findings that a range of ability in class increases understanding among the group as a whole. The sessions where there was an opportunity to properly role-play and discuss the implications of the assessment resulted in a better, more holistic group participation in the training. By combining Lowry's suggestions to facilitate self-directedness among learners with a programme of peer support into training we can improve students' preparedness for practice, and encourage all learners to make the most of self-directed mobile learning. However, ultimately the student enters the work placement alone and we must be realistic regarding the degree to which we expect students to challenge a risk averse environment like the NHS when they inhabit a relatively insignificant place in it. Over time we hope that the acceptability of mobile technology for education purposes will help to change attitudes among healthcare institutions and workers, making this a less challenging process for students.

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## Context in a Wider Context

John Traxler

### Abstract

*This paper attempts to review and reconsider the role of context in mobile learning and starts by outlining definitions of context-aware mobile learning as the technologies have become more mature, more robust and more widely available and as the notion of context has become progressively richer.*

*The future role of context-aware mobile learning is considered within the context of the future of mobile learning as it moves from the challenges and opportunities of pedagogy and technology to the challenges and opportunities of policy, scale, sustainability, equity and engagement with augmented reality, «blended learning», «learner devices», «user-generated contexts» and the «internet of things». This is essentially a perspective on mobile learning, and other forms of technology-enhanced learning (TEL), where educators and their institutions set the agenda and manage change.*

*There are, however, other perspectives on context. The increasing availability and use of smart-phones and other personal mobile devices with similar powerful functionality means that the experience of context for many people, in the form of personalized or location-based services, is an increasingly social and informal experience, rather than a specialist or educational experience.*

*This is part of the transformative impact of mobility and connectedness on our societies brought about by these universal, ubiquitous and pervasive technologies.*

*This paper contributes a revised understanding of context in the wider context (sic) of the transformations taking place in our societies. These are subtle but pervasive transformations of jobs, work and the economy, of our sense of time, space and place, of knowing and learning, and of community and identity. This leads to a radical reconsideration of context as the notions of «self» and «other» are transformed.*

### 1 Introduction

The structure of the paper is as follows: we start by considering context-aware learning as a specific focus within mobile learning research, itself probably a vanguard within researchers engaged in technology-enhanced learning, and how its development has led to progressively richer conceptions of context. The second half of the paper looks at the impact of wider mobility and connectedness, specifically at how the conventional conceptualisation of context creates a

dichotomy between «self», the user or learner, and «other», the environment, the surroundings.

## **2 Context in Mobile Learning**

We must start with a brief review of the notion of «context» and the role it has played in mobile learning. It has been as one of the defining contributions of mobile learning to the wider field of technology-enhanced learning, exploiting the personal and portable nature of the devices and their capacity to sense some aspects of their context, initially their location and trajectory. Context has been defined and classified in a variety of different ways. A working definition might be, «the formal or informal setting in which a situation occurs; it can include many aspects or dimensions, such as environment, social activity, goals or tasks of groups and individuals; time (year/month/day).» (Brown 2010:7) or «any information that can be used to characterize the situation of an entity, where an entity can be a person, place, or physical or computational object» and thus, context-awareness or context-aware computing is «the use of context to provide task-relevant information and/or services to a user» (Dey & Abowd, 1999:1), «typically the location, identity and state of people, groups, and computational and physical objects». The same source looks at context from different perspectives. It makes the distinction between, on the one hand, those contexts that relate to the user's environment, including attributes such as their emotional state, focus of attention, social and informational state, and, on the other hand, those contexts relating to the application's environment, surroundings, settings or states, or the current environment as a whole. Some attributes are common to both types of context including location, time of day, season, temperature, identities of people and objects around the user and changes to these identities. At least two other classifications of contexts have been proposed. The first (Schilit et al., 1994; Chen & Kotz, 2000), defines four categories of contexts:

- Computing context including network connectivity, communication costs and bandwidth, nearby resources such as printers, displays and workstations, though this however becomes progressively less significant as the factors concerned become more stable, uniform, transparent and capable.
- Physical context including lighting, noise levels, traffic conditions and temperature though these too may also become less significant as devices become more impervious to many of these aspects of physical context.
- User context including the user profile, location, people nearby and current social situation. Increasingly devices might give orientation and might sense or even recognise objects in their vicinity so this aspect continues to become richer and the «internet of things» (Siorpaes et al., 2006) increasingly draws the physical world and its objects into the virtual world.
- Time context including obviously time of day, week, month and season of year.

The second classification (Schmidt et al., 1998), contains two categories from the two different perspectives.

- Human factors
  - User, their personal habits, mental state, etc.
  - Social environment, namely the proximity of other people, social relations, collaboration
  - Task, any goal directed activities or more general objectives
- Physical environment
  - Location
  - Infrastructure, the interactive and computing environment
  - Conditions such as the level of noise, brightness etc.

There were also attempts to classify contexts specifically in relation to learning; one source, for example (Wang, 2004) breaks learning contexts into six dimensions: identity, spatio-temporal, facility, activity, learner and community. Identity characterises the unique learner, spatio-temporal is the time and location aspect of the learning process, facility is the type of mobile device being used, activity categorises the learning activity taking place, such as individual or collaborative, the learner dimension describes characteristics such as «learning style» and knowledge level and the community aspect describes the social interactions between participants.

These distinctions are typical of attempts to define and delineate precise aspects of context. More recently, however, the distinction between the learner or user and their context or environment has been eroded by the notion of «user-generated contexts» (Cook, 2010), a concept named to emphasise the role of learners themselves in shaping their own context, «the context within which communication takes place is augmented by users to suit the needs of the individual and/or the conversational community» (Cook et al., 2010:4).

Alongside these developments, a more philosophical debate takes place, characterising our description so far as largely only one perspective of two (Dourish, 2004: 20). It is «a technical notion, one that offers system developers new ways to conceptualise human action and the relationship between that action and computational systems to support it». The other view draws «analytic attention to certain aspects of social settings» and argues that the earlier position was essentially positivist and that there is an alternative viewpoint, one of phenomenology. It leads to a different view of context. Rather than context as information, it is «a relational property that holds between objects or activities» and thus signifies relevance; rather than delineated and defined in advance, context is defined dynamically; rather than stable, context is local to each occasion of activity or action; rather than context and content being two separable entities, «context arises from the activity.

Context isn't just «there», but is actively produced, maintained and enacted in the course of the activity at hand» (Dourish, 2004:22).

Context can thus also be proximity and relevance as we have seen, and as difference and change; it can be seen as a description of that which differentiates, what is different in what is near or recent and what is further or earlier in relation to the subject. Originally, these factors related to physical or geometric distance but clearly there are other aspects, perhaps social proximity or pedagogic proximity. An early definition of context gets near to these other ideas of proximity, defining it as «location and the identity of nearby people and objects» (Schilit & Theimer, 1994) and argue for social dimensions, saying: «Context encompasses more than just the user's location, because other things of interest are also mobile and changing. Context includes lighting, noise level, network connectivity, communication costs, communication bandwidth and even [our emphasis] the social situation, e.g., whether you are with your manager or with a co-worker.»

Perhaps the last word for the moment should be, «Context» is a slippery notion. Perhaps appropriately, it is a concept that keeps to the periphery, and slips away when one attempts to define it» (Dourish, 2004:29).

### **3 How Things Have Changed**

These developments in the ideas and practice of context-aware mobile learning came, however, out of a particular historical and social milieu. They were embedded deeply within the mobile learning research community and seen as a major development and contribution to the wider field of technology enhanced learning. In the early days of mobile learning, perhaps the first six or seven years of this century, these developments helped place the mobile learning research community amongst the vanguard of technology-enhanced learning in an era when most people's, most learners' access to powerful and expensive educational technologies was through educational institutions. This was due to their relative cost, bulk and scarcity; it was mainly networked desktop computers running dedicated educational software integrated into wider institutional software systems, such as library software and student enrolment software. It was and partly still is the corollary of an institutional culture in which research and development in technology-enhanced learning formed part of a «research economy», where institutional research teams bid for project funding, conduct the research, usually in-house, small-scale and by definition fixed-term, publish the results and move onto the next funding opportunity. It was also part of an expectation that the institution would procure, provide, install and control any subsequent deployment of learning technology and it was part of a related expectation that the institution would promulgate technical and operational standards for learning technology in order to ensure equity, accessibility, uniformity and cost-effectiveness.

Now, for reasons of cost and sustainability, the focus has moved to «learner devices», those owned by learners (Traxler, 2010a) and with it the locus of agency and control has moved from the institution to the learner. This is challenging and complex and leaves much to be negotiated; but if the professionals within institutions can accept the challenges then scale and sustainability become distinct possibilities for mobile learning in general including context-aware mobile learning. Learner devices, actually just devices typical of the current retail domain, offer location-awareness and often augmented reality along with much other sophisticated functionality. However attractive this may sound, the challenges include equity, standards, quality assurance, infrastructure, security and embedding and blending with institutional «blended learning».

Much of the work so far could be seen in retrospect as an aspect of a web1.0 ideology, where the user is merely the reader, consumer or recipient. There was, however, some work with a more web2.0 perspective, where users were writers, producers and contributors. This was educational, recreational, reflective, expressive and creative.

One limitation of many early projects was that their temporal and sometimes spatial aspects were bounded or episodic; not only were the projects themselves fixed-term and small-scale, but the experience of the individual learner or user was limited to a short time, the length of their visit, and perhaps to a particular physical location such as a museum or heritage site. Outside these bounds, the experience was either exhausted or curtailed; and the predominant aspects of context were usually just spatial and temporal. The increased technical capacity, functionality and connectivity, especially indoors and in metropolitan areas, however, offer a financially sustainable way to move beyond the merely local, anonymous and episodic experiences of much of this earlier informal context-aware mobile learning and offer a much richer experience as well. It is possible to imagine in the near future, perhaps linked museums for example the Ironbridge Gorge Museums in Shropshire or the South Kensington museums in London or national organisations with heritage sites such as English Heritage or the National Trust where successive or repeat visits of groups or individual using their own devices build a cumulatively richer and perhaps more collaborative experience.

#### **4 The Mobility and Connection of Society**

The last three or four years have seen a rapid change in the ownership of powerful digital technologies for learning. As we said, this was previously predominantly uniform networked desktop computers in educational institutions; now it is highly functional but diverse and rapidly changing personal mobile phones across the vast majority of our society, learners and others alike.

Consequently, we now cross from a technical or reformist account of context to a radical or social account and a shift of context-aware mobile learning from a component of mobile learning to the educational component of context-aware services and experiences.

This is having dramatic, though maybe unnoticed, implications for the role, direction and significance of the mobile learning research community, as we shall see. It has implications for the relationships between learners and their educational institutions. It also has a profound, pervasive but subtle impact on work, jobs, businesses and the economy; on perceptions of time, space and place; on the individual, their identity and the nature of communities; on knowledge, knowing, understanding and learning and on consequently on a changed meaning for <context> and its role in education. Our underlying content is that earlier work on context-aware mobile learning was predicated on specific fixed ideas about <self> and <other>, as articulated within institutions, and that the impact of wide social mobility and connectedness in the way we outline have significantly transformed these ideas.

## 5 Time and Space

We will start by looking briefly at time, space and place and their implications for <context>. We draw on what we have said elsewhere (Traxler, 2010b).

Firstly, interacting with a desktop computer and thus entering cyberspace takes place in a bubble, in dedicated times and places where the user has their back to the world for a substantial and probably premeditated episode. Interacting with a mobile is different and woven into all the times and places of users' lives. Whereas the desktop computer imposes quite a rigid and separate set of contexts on a user or learner – they are either learning or they are doing something else equally specific –, mobiles produce or enforce a more fragmentary and transient movement between multiple user-contexts. One consequence of shift of cyberspace from desktop to mobile is that real and virtual spaces and the contexts that they represent become interwoven ... the user works now in overlapping and fragmentary contexts, where other roles or contexts can easily intrude. Users are no longer dedicated learners nor are they stable contexts.

Mobile technologies erode ideas of physical time as the common temporal context and the temporal context «... can instead be socially negotiated» (Sørensen et al., 2002:3) alongside the «softening of schedules» (Ling, 2004:73) afforded by mobile devices. Nyíri (2006:301) says: «with the mobile phone, time has become personalized». Or perhaps, «... this means the replacement one time by a series of overlapping times» (Cooper, 2001:25) or overlapping temporal contexts. Nowadays, «One can be interrupted or interrupt friends and colleagues at any time. Individuals live in the phonespace – they can never let it go, because it is their primary link



to the temporally, spatially fragmented network of friends and colleagues they have constructed for themselves. It has become their new umbilical cord, pulling the information society's digital infrastructure into their very bodies. In fact, as technical evangelists at Nokia pondered, mobile communications could eventually evolve into an activity indistinguishable from telepathy.» (Townsend, 2001:70). Mobile Times, a recent Intel project (<http://paper.intel-research.net/projects.htm#time>), talks about time becoming 'plastic' saying: «The experience of 'plastic time' frames modern life. It is an experience that is highly interruptible, shrinking and expanding around immediate concerns, and interleaving through multiple activities». Elsewhere Intel researchers say: «Conflicts arise not when people have more to do, but increasingly diverse things to switch between, creating the need to 'shift gears' frequently». This sounds to a computer scientist like the overheads associated with 'context-switching' (sic).

Agar (2003: 4) makes a direct comparison between the mobile phone and wristwatch, in terms of intimacy and ownership. He also, however, makes a contrast, a direct contrast in terms of personal freedom: «while it might have felt like liberation from tradition, the owner was caught anew in a more modern rationality, for, despite the fact that the pocket watch gave the owner personal access to exact time, accuracy depended on being part of a system». In fact, it made the owner part of a system, part of a stable universal temporal context. Wristwatches are handcuffs, keeping the wearer in only one temporal context at a time (sic). Time zones, another temporal artefact of the Industrial Revolution, devised in the aftermath of the new national railway networks, have a similar effect of creating a large-scale unified and monolithic temporal context.

Now, of course, personal mobile connectedness (and the mobility of the car) erodes these too; international travellers are no longer locked into their local time zone, their own local temporal context. Mobile phones mean they are also tethered to family temporal contexts back home and to the rhythms of their office and colleagues back at base or across a range of global offices rather than exclusively to their own physical context, location and contacts.

Staid (2008:157), in talking about 'the phone as mobile log', reminds us that mobiles are «a kind of life diary that saves experiences, memories, thoughts, or moments in a visual and textual form. The sim card in your phone could be seen to contain the story of your life (at least at the present time): not just text messages, photos and videos, but also chosen or given tokens such as icons, ring tones, music lists; and the diary, address book, alarm clock all save and display the experiences and activities of the user as they have been mediated and captured by the mobile.» This second-by-second account of our lives is another way in which mobiles transform our sense of time passing, populating our personal user-generated temporal

context with an unprecedented level of detail, making it more finely-grained whilst plastic and fractured.

Furthermore, the increase of rolling news, off-air recording and domestic video-on-demand means that TV schedules no longer provide a synchronous and collective context that bound informal groups together in the way they used to a generation ago. Students can no longer all discuss last night's programmes when they arrive at university, each relating to a common temporal and social context. Ling (2008:62) makes a similar point, citing the lost rituals of watching national TV news in Norway saying: «In this way the TV, and the particular news program, provided a kind of ontological security». At the same time, news is becoming more local, the news of your online community rather than global news (Bilton, 2010), altering the shape of the informational context of the user, reconfiguring the informational, historical and social contexts of users as the old landmarks are re-aligned, removed or replaced.

## **6 Place, Space and Presence**

Mobile devices are accelerating the erosion of physical place as the predominant aspect of the spatial context started by other networked digital technologies. It is being diluted by «absent presence» (Gergen, 1996), the phenomenon of physically social co-located groups all connected online elsewhere and by «simultaneity of place» (International Telecommunications Union, 2004:20, paraphrasing Plant, 2000) created by mobile phones, that is one physical space and multiple mobile virtual spaces of conversational interaction instead of a solid stable spatial context.

Fortunati (2002:515) relates absent presence to a discussion of personal and public spaces, suggesting a preference for the known and private that forces us away from the physical. «[Y]ou have the possibility of choosing between the public space of streets, stations, means of transport and the private space of interpersonal relationships, between chance socialness which may develop with those who happen to be passing by, and chosen socialness (e. g. with the friends you decide to call on your mobile phone). And it is obvious that the choice always falls on the second, if only because it represents the encroaching «new».»

She continues by eliding absent presence with motion and then discussing the value and valorisation of space: «This phenomenon is evident in means of transport. Compartment conversation, a typical communicative mode in which nothing very important is said, is increasingly often silenced by selected but artificial conversations (that is, by the mobile). The individual is in one place, as a physical presence, but virtually, as an immaterial presence, he or she is elsewhere. And elsewhere that takes on an ever-increasing fascination, because it gives the reality of space a new connotation.»

«Physical space in fact is emptied of significance, becomes less dense as thickness, as the dimension of virtual space is grafted on to it. This phenomenon has, however, the implication that more and more distance is created with the unknown. Today it is difficult to surrender oneself to «unknown lands» because one can face them armed with a mobile, thus defended by the socialness of one's point of departure. As we said above, it is increasingly evident that between chosen and chance sociality the interest is much more on chosen, even if this is virtual. In fact, the more one is forced into mobility, that is, into travelling great distances towards the unknown, the more one has to stress relations with what is familiar.» This has taken the discussion of space, and the spatial context, to a discussion of agency and choices about which spaces to inhabit and which to avoid.

This analysis is not universally accepted. Some authors say mobiles attach people more strongly to existing social groups and contexts at the expense of joining or forming new ones; others, that they facilitate wide shallow affiliations at the expense of fewer deeper ones (Geser, 2004, McEwen, 2010). Whichever is actually the case, we are clearly seeing social proximity and social context changing from its established forms, being pulled and pushed and stretched differently.

She (Fortunati, 2002: 514) sees the underlying and unifying motivation for using mobile devices as somehow trying to wring more from both space and time: «The attempt is to enlarge the surface of space and the duration of time by means of communicative technologies. Space has widened out horizontally, lengthened out vertically, and at the same time is perceived as a background; while time is experienced in all its extensions and expanded in thickness. Space and time have thus become the new frontiers of increased social productivity.» This portrays users' temporal and spatial contexts as some kind of resource or raw material (spatio-temporal capital perhaps or space-time as a commodity) resonating with the capitalist injunction that «time is money» and connecting with the earlier Protestant valorisation of punctuality (Banks, 2006).

Time and space become more complex, they also become more confusing: «What space and time has the mobile found itself interacting with? With a space that was already transformed before, developing its technological aspect, informative, multicultural, mobile and relational, in short, becoming a complex space, not immediately easy to understand. The increasing difficulty in people's immediate and effective relation with space, which has become increasingly difficult to understand, has been an important element at the base of the spread and success of the mobile phone. This instrument, in fact, has enabled people to somehow attenuate their anxiety and bewilderment in the face of this new quality and dimension of space. The mobile phone is a device that enables people, when they perceive the surrounding environment as extraneous to them, to contact

somebody of their intimate circle, that is, to activate the reassuring procedure of recognition. In other words, people react to the lack of informative immediacy of the place, strengthening communicative immediacy with their social networks by means of the mobile». (Fortunati, 2002:514) Therefore, temporal and spatial contexts are bewildering and unsettling.

## **7 Different Spaces**

Mobile devices are reconfiguring the relationships between spaces, between public spaces and private ones, between public and private contexts, and the ways in which these are penetrated by mobile virtual spaces. This reconfiguration is accompanied by what goes on within those spaces. Cooper (2002:22) says that the private «is no longer conceivable as what goes on, discreetly, in the life of the individual away from the public domain, or as subsequently represented in individual consciousness» (Sheller & Urry, 2003:1). «The use of these mobile sound technologies informs us about how users attempt to <inhabit> the spaces within which they move. The use of these technologies appears to bind the disparate threads of much urban movement together, both <filling> the spaces <in-between> communication or meetings and structuring the spaces thus occupied» (Bull, 2005:344). More so, with the rise of noise-cancelling earphones, which further distance the local physical context.

This is part of a growing dislocation of time and place, in which «everything arrives without any need to depart» (Virilio, 2000:20). «Closer to what is far away than to what is just beside us, we are becoming progressively detached from ourselves» (Virilio, 2000:83). Owing to «the tendency to previsit locations, through one medium or another; to actually arrive somewhere is no longer surprising in the way that it was .... it is becoming replaced by prevision. Thus according to this logic, the mobile would be one more technique by which the world became unsurprising.» (Cooper, 2002:26) Another personal device, the in-car sat-nav, has a similar effect, that of previsiting places and locations. Other personal digital devices, such as the camcorder, the camera, allow us to recreate the past, to revisit places and locations, whilst augmented reality can supplement real places with imagined or imaginary ones. Moreover, «the instant availability of all types of information at any time or place means that there will be no need for physical motion» (Cooper, 2001:25); inertia or stagnation set in and the balance and proportions, the boundaries and the edges within the temporal context are transformed.

At an Eduserv conference in London in 2010, delegates were asked not to watch the presentations on the live stream on their own laptops, presentations taking place literally a few feet in front of them. Is this some preference for the virtual, the next stage in absent presence?

There are a growing number of augmented reality applications available as retail downloads for smart-phones. These also add to the dilution of the immediate experience of the here-and-now. Examples include Layar, allowing developers to add layers onto the iPhone and Android phone's video, a «mash-up» based on what the camera in the phone currently sees; Wikitude AR Travel Guide, which brings contextual Wikipedia information to what the camera currently sees; TAT Augmented ID, which uses the Flickr facial recognition technology to identify a person's face and overlay their image with their online profile and contact information and TwittARound, which takes an iPhone's camera and overlays live video of the world around it with tweets. Ever increasing exposure to CGI and Photoshop, for example, must mean that our relations with what we used to think of as «reality» are becoming ever more complex.

Augmented reality applications (Papagiannakis et al., 2008) and Google Maps with Street View both dilute the here-and-now; an ever-growing sense of surveillance and nervousness is implicit, too, as users become more known, visible and connected to their various contexts. Surveillance might be seen as a dilution of identity, watering down who one is, at the same time as digital identities become more complex. Identity becomes more complex and fluid as we acquire and discard digital identities and join and leave digital communities within which these digital identities have meaning making social contexts become more fluid.

## **8 Interactive Travel through Contexts**

Elsewhere, authors (Germann-Molz, 2010) have commented on the «emergence of interactive travel, a mode of leisure travel that involves staying electronically connected while on the move». Characterised by travellers using mobile technologies «as a way of creating knowledge and negotiating on-the-road «know-how». Leisure travellers are increasingly integrating mobile technologies such as laptop computers, wireless cards, MP3 players, GPS devices and mobile phones into their journeys in order to research and plan their trips, network with other travellers, share advice, and record, photograph and publish their experiences for the internet public. The result is a proliferation of online travel blogs, networked backpacker communities, mobile travel guides, hospitality networking sites, travel discussion boards, and the digital sharing of videos and photographs from travellers' journeys.» This is another way in which the real and virtual worlds, the real and virtual spatial contexts, are linked and interwoven; these travellers are «not only physically on the move, but are constantly moving amongst these overlapping virtual, imaginative, communicative and corporeal spaces of social interaction.»

## 9 Ragged and Uneven Contexts

Of course, mobility and connectedness do not sweep away the boundaries of time and spaces. Nor, as we have seen, are the spatial and temporal contexts more homogeneous or isotropic. They have moorings and tethering of their own. Spaces are now defined by the availability of varieties of network coverage, by mains power sockets and by ambient lighting levels, without direct sunlight. Time is now measured by battery life; movement is restricted by cables, backing up and synching, in much the same way that, cars, the other symbol of modern Western mobility are tethered to servicing schedules, flat-tyres, traffic jams, car-parking spaces and filling stations. «Mobilities cannot be described without attention to the necessary spatial, infrastructural and institutional moorings that configure and enable mobilities ... There is no linear increase in fluidity without extensive systems of immobility ...» (Hannam et al., 2006)

## 10 Individuals, their Identities and Communities

Mobility and connection are also amongst the factors changing individuals and their identities, and the nature of communities. The rise of networked technologies has led to far more complex ideas about identity, both formally, in relation to «official» network technologies, and informally, in relation to social networks. What constitutes the user, his/her self, as opposed to his/her context changes and blurs. Some authors describe personal mobile devices as becoming prosthetic; Pertierra (2005:27) says: «Unlike desktops and other immobile technologies, mobile phones more closely resemble tools or prosthetic devices as extensions of the body. They become extensions of the hand, allowing us to connect anytime, anywhere, with anybody. Bodies themselves become writing devices as phoneurs negotiate new urban spaces.» Other authors describe them as becoming embodied (for example, Rettie, 2005) or say: «From pacifier, to nipple, to digital umbilical cord, the mobile phone rapidly progressed to assume a vital place in the virtual biology of urban information societies of the late twentieth century» (Goggin, 2006). «At the final extreme, the mobile phone's connectivity might be completely subsumed into the body, and all other forms of communication become redundant email, web, phone calls, all can be delivered over the universal handheld» (Townsend, 2001:70). If context is a way of characterising the relationship between person and the environment, then what we are seeing this renegotiated in a variety of ways, in this case in the body and its tools. A different aspect of the embodiment of mobile phones was widely reported. «I'd rather» deadpan Philippa Grogan, 16, «give up, like, a kidney than my phone. How did you manage before? Carrier pigeons? Letters? Going round each other's houses on BIKES?» (Guardian 2010). So we see a much more fluid and fractured account of who we are, of our «selves»,

and likewise a more fluid and complex account of the physical environment and social communities that constitute our context.

### **11 Knowledge, Knowing, Understanding and Learning**

Mobile devices affect the processes by which ideas, images, information and knowledge, and hence informal learning, are produced, stored, evaluated, valorised, distributed, delivered and consumed. They are now part of a system that allows everyone, including learners and potential learners, to generate and transmit content for learning, not just passively store and consume it, making mobile systems an integral part of the Web2.0 ideology that takes users from merely the Web's readers to its writers. The impact of mobility and connectedness on knowledge is to make it far more obviously relative, local, transient and partial. Knowledge is local in being local to a community, local in being location-specific, produced locally and consumed with defined communities, not necessarily geographically or spatially defined communities. The informational context is no longer fixed, monolithic and external.

In formal learning, we already see changed ideas about space and knowledge reflected in two emerging pedagogies, «navigationism» (Brown 2005) and «connectionism» (Siemens, 2004). These grow out of networked and mobile learning and shift the balance between ideas themselves and the relationships between them, emphasising a kind of knowledge space, a topology of points rather than a geography of bulky masses thus transforming the intellectual or cognitive context within which learners move. Connectivism explicitly assumes «knowledge is distributed across a network of connections, and therefore ... learning consists of the ability to construct and traverse those networks» (Downes, 2007). Therefore, we see changed perspectives on the relationships between knowledge and knower, or learning and the learner, with a far less straightforward relationship and boundary between each pair.

### **12 The Future of Context**

In the words of a recent newspaper article (Bilton, 2010):

If you pull out your smartphone and click the button that says «locate me» on your mapping application, you will see a small dot appear in the middle of the screen.

That's you.

If you start walking down the street in any direction, the whole screen will move right along with you, no matter where you go.

This is a revolutionary change from the print-on-paper, where maps and locations are based around places and landmarks, not on you and your location.

The newspaper article's title makes the point more succinctly: «Where the individual is front and center». Yes, in any consideration of context, the learner or user is «front and center».

The early half of our argument endorses this idea and portrays the relationships between individual and environment as becoming increasingly richer and easier, as increasingly easy to exploit and deploy in support of existing, enhanced or reformed pedagogies, though recognising that that we, not our surroundings, are now the focus and the source. The second part of our argument, however, is that social changes mean that this user at «the front and center» is no longer distinct and separate, no longer «a small dot», more smeared and blurred in time, space, knowledge, community and identity, the boundary between «self» and «other» unsettled, dissolving and ill at ease. Perhaps we must also question whether the technologies of context are contributing to an enriched and augmented reality or just distracting our attention from a reality that technology is diluting, depleting and diminishing.

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