

Outline of a Microlearning Agenda

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Summary

In this paper we map the changing but ultimately convergent meanings of the term “microlearning” as they have emerged and developed over the last few years. We explore how the term works to organize and order a set of pedagogical and technological phenomena and concepts in new and interesting ways. Beginning with varying definitions of the term, we present a brief review of the research and informal literatures that have quickly developed around it. We advocate speaking of microlearning in terms of special moments or episodes of learning while dealing with specific tasks or content, and engaging in small but conscious steps.

Based on this overview, we develop the thesis that the “microlearning agenda” - as an explicit emphasis on the minute and particular in teaching, learning and technology - presents valuable lessons for research into technology and media in education generally. We reveal microlearning to be not simply as one approach among many, but instead as a perspective that applies to many aspects of education, as something that goes on continuously, whether it is an explicit focus for research and technology development or not. As such, we show that the lessons gained through microlearning have a generalized applicability to the studies of media and technology in education in the broadest possible sense.

We conclude by considering some lessons to be drawn from recent discussions of microlearning. These focus on the constraints and freedoms for learners and also on the pedagogical responsibility of teachers. The yet inconclusive and polyvocal nature of microlearning discourse is a good thing, and we believe it should be cultivated and encouraged.

Keywords: microlearning, didactics, learning, teaching, technology, models, didactical theories

1 Introduction

In the rapidly-changing world of the Internet and the Web, theory and research frequently struggle to catch up to developments, interactions and permutations in technology and the social forms and practices evolving with it. Although the acuity of this situation may be new, the notion of the cultural forms of research (and society in general) lagging behind technological developments is not novel. As early as the 1920's, William Ogburn's theory of social change (1950) identified cultural lags as being an important part of the social dynamics associated with technological innovation. Even though we have much more complex conceptions of interdependent dimensions of social, cultural and medial change and the analysis of multiplex systems (cf. Rusch et al., 2007) today, challenges for timeliness and topicality of theory remain. In the social sciences generally, Internet and Web Studies have emerged to address this lag between Internet practices and corresponding theories by developing and adapting ethnographic, social-psychological, linguistic, critical and other methodologies. These now serve as ways of investigating new online manifestations of identity, language use, and other cultural, commercial and technical forms - from blogging through YouTube. In educational research, a similar proliferation of novel practices, applications, and forms - from online educational games to learning objects, from bulletin boards to wikis - have come to be addressed under rubrics such as “e-learning,” “distributed education,” or “networked learning.”

Naturally, a number of more specific catchphrases and terms have been circulating to label, categorize and also promote more particular practices, ideas and forms. These include e-learning 2.0, personal learning environments, game-based learning, and more.

Together, these terms and rubrics help to map out an emerging sociotechnical landscape. However, this terrain is itself shifting and changing, constantly underscoring the provisional and negotiable nature of terms and labels. In many cases, terms attempt to stake out terrain that is as of yet emerging, sometimes going too far off the mark, and (less frequently), being too conservative in their estimation of the richness or extent of the territory identified.

With this in mind, this paper will begin by mapping the changing but ultimately convergent definitions of the term “microlearning” as they have emerged and developed over the past five years or more. It will also explore how this term and its dynamics help to organize and order a set of pedagogical and technological phenomena and concepts in new and interesting ways. This article will also examine how the emergence and development of the term “microlearning” presents lessons for a range of interrelated concerns that continue to proliferate at the intersection of the social, technical and educational.

We begin with an overview of the definitional issues related to micro-learning. It then presents a brief review of the research and informal literatures that have quickly been amassed in this new field. From this overview, it develops the thesis that the “microlearning agenda” - as an explicit emphasis on the minute and particular in teaching, learning and technology - presents valuable lessons for research into technology and media in education generally. Microlearning is revealed in these contexts not simply as one approach among many, but as a perspective that applies to many aspects of education, as something that goes on continuously, whether it is an explicit focus for research and technology development or not. As such, the lessons gained through microlearning are shown to have a generalized applicability to the studies of media and technology in education in the broadest possible sense. We conclude our discussion of concepts, didactics, politics and structures of microlearning by presenting some microlearning lessons. These lessons focus on the constraints and freedoms for learners and the pedagogical responsibility of teachers.

2 Definition and Context

As indicated earlier, in contrast to microteaching (cf. Dwight & Ryan, 1969) and also to other terms such as microphysics or microbiology, microlearning is a rather new expression. Similar to related expressions like microcontent or micromedia, it has been in use only since about 2002, though many aspects of learning, didactics and education have, of course been addressed on what can be called a “micro” level for centuries.

The discourse, or rather, multiple discourses that have emerged and developed around microlearning are above all polyvocal and international. In addition to a strong central-european presence, a glance at the tables of contents of the published collections in microlearning (from Innsbruck University Press) reveals contributions from North America, Asia, Australia, as well as other parts of Europe. Such cultural, geographic and linguistic heterogeneity underscores the fact that the technology central to microlearning - like any technologies or technical systems - are not constituted in isolation, producing the same results in different institutional, social and cultural contexts. Instead, this technology and these systems are inextricably intertwined, and this embedding of the technical in the social and cultural is given expression in this introduction by referring to the “socio-technical” (e.g., see Hughes, 2001).

The heterogeneity of the contexts, cultures and ultimately, meanings associated with the term microlearning is further compounded by heterogeneity of the term learning itself. For example, learning can be conceptualized as a process of building up and organizing [knowledge](#). But it can also refer to the change of [behaviour](#), of [attitudes](#), of [values](#), of mental abilities, of task performance of [cognitive](#) structures, of emotional reactions, of action patterns or of social dynamics. No matter how learning is conceptualized, in all cases there is the possibility of

considering it in terms of [micro](#), [meso](#) and [macro](#) aspects or levels (cf. Hug 2005, p.4). As a result, microlearning can be understood in manifold ways which can refer to micro aspects of a variety of phenomena including learning models and concepts.

Along with that, the corresponding levels of meso learning or macro learning can refer to different areas, too (see figure 1).

	Example 1 <i>Linguistics</i>	Example 2 <i>Language learning</i>	Example 3 <i>Learning contents</i>	Example 4 <i>Course structure</i>	Example 5 <i>Competency classification</i>	Example 6 <i>Sociology</i>
micro level	single letters	vocables, phrases, sentences	learning objects, micro content	learning objects	competencies of learners or teachers	individualized learning
meso level	words, letter-figure combinations, sentences	situations, episodes	sub areas, narrow themes	topics, lessons	designing a lecture	group learning or organizational learning
macro level	texts, conversation, linguistic communication	socio-cultural specifics, complex semantics	topics, subjects	courses, curricular structures	designing a curriculum	learning of generations, learning of societies

Figure 1. Microlearning - mesolearning - macrolearning (cf. Hug, 2005, p. 3).

These kinds of illustrative distinctions help to show the many ways in which microlearning can be understood. Depending on frames of reference and economies of scale, micro, meso and macro aspects vary. They are relational rather than “absolute.” For example, in the context of language learning, one might think of micro aspects in terms of vocabularies, phrases, sentences, and distinguish them from situations and episodes (as meso aspects) and socio-cultural specifics or complex semantics (as macro aspects). In a more general discourse on learning, one might differentiate between learning on individual, group, or very broad social and/or generational levels. But whether “microlearning” is defined in terms of content, processes, technologies, competencies or learner groups, the key, of course is that which is occurring at the most minute of levels - as opposed to the meso or macro: minutes or seconds of time are relevant instead of hours, days or months; sentences, headlines, or clips are the focus rather than paragraphs, articles, programs or presentations; and portable technologies, loosely-coupled distributed environments are of interest rather than monolithic or integrated turnkey systems.

A second and broader context for the definitions of microlearning is provided by characteristics and dynamics associated with “knowledge economies.” These characteristics include, of course, an increasing economic dependence on the generation, circulation and utilization of productive knowledge, and attendant pressures for instant access, workforce retraining and lifelong learning. Generally speaking, these factors are seen to involve increasing nomadism of those generating and using knowledge, and also decreasing longevity and even coherence of knowledge itself:

Microlearning as a term reflects the emerging reality of the ever-increasing fragmentation of both information sources and information units used for learning, especially in fast-moving areas which see rapid development and a constantly high degree of change. (Langreiter & Bolka, 2006, p. 79)

These processes are also linked with changing media industries. The diffusion of technological innovation necessitates the transformation or renewal of value propositions and business models. Making explicit reference to “micromedia,” Umair Haque (2005) describes some of the conditions necessitating this transformation as follows:

Micromedia is media produced by prosumers (or amateurs; sometimes, it's called 'consumer-generated content'). Micromedia differs fundamentally from mass media. First, it's usually microchunked. Second, because it's microchunked, it's plastic. Third, micromedia is liquid: prosumers can trade info about it via ratings, reviews, tags, comments, playlists, or a plethora of others. These are also micromedia; micromedia whose economic value lies in its complementarity with other micromedia. (2005)

Apart from other complementarities with meso- or macromedia (cf. Rusch et al., 2007, p. 13), it is important to realize that this discussion is rather about complex interrelations and new dynamics than just about small screen sizes or the nomadicity implied in handheld devices. Although the absolute novelty of the current situation - and the absolute centrality of knowledge in it - are subject to debate (e.g., Seidensticker, 2006; Friesen, 2006), it is difficult to dispute that the increasing speed, fragmentation and mobility of information production and consumption presents a new milieu for media production and forms.

Whether our focus is on learning tasks and processes, products and outcomes, it is important to avoid definitions of microlearning that lack discriminating or differentiating power. If microlearning is simply equated with informal learning, lifelong learning, or being "bathed in bits" in the digital mediasphere (see Tapscott, 1999), we end up in a night in which all cows are black. If *everything* is microlearning, *nothing* of it is to be considered of special importance. Consequently, we advocate speaking of microlearning in terms of special moments or episodes of learning while dealing with specific tasks or content, and engaging in small but conscious steps. These moments, episodes and processes may vary depending on the pedagogies and media involved, but the measures of scale of the amount of time and content involved can be made fairly constant. For example, microlearning can involve the use of different media technologies - book printing, radio, film, TV, computer, Internet and others. It can be utilized with a range of pedagogies, including, reflective, pragmatist, conceptionalist, constructivist, connectivist, or behaviourist learning, or action-, task-, exercise-, goal- or problem-oriented learning. It can be designed for classroom learning as well as for corporate learning or continuing education, entailing *processes* that may be separate or concurrent, situated or integrated into other activities. It may follow iterative methods, networked patterns or certain modes of attention management entailing different degrees of awareness. Finally, the *form* of a final microlearning product may have characteristics of fragments, facets, episodes, skill elements, discrete tasks, etc. But while it is amenable to all of these forms, contexts, technologies and combinations, in terms of its temporality and substance, microlearning carries some relatively simple markers: In terms of *time* microlearning is related to relatively short efforts and low degrees of time consumption. And in terms of *content* microlearning deals with small or very small units and rather narrow topics, even though aspects of literacy and multimodality (cf. Kress, 2003, pp. 35-59) may play a complex role.

3 Didactics of Microlearning

As to *didactics* of microlearning, it is important to be aware of different cultural and academic traditions. In the French speaking cultural area "didactique" also means a literary genre, and in German traditions we find a variety of concepts, models and understandings. By way of contrast, Anglo-American discussions on didactics mainly focus on instructional design or theory (see Friesen in this volume). Attempting to straddle these different traditions, this introduction uses the terms "didactics" to designate very generally processes of design and reflection related to teaching and learning. Depending on the level of reflection and theoretical or practical demands, didactics can also be seen to refer to concepts, approaches, models, theories, experiences, or technologies, or to questions of an art of teaching and learning. Furthermore, these considerations may focus on subjects (who), contents and skills (what), methods and technologies (how), reasons, purposes, and goals (why and what for), as well as on social relations, institutional and societal conditions, settings and arrangements, learning ecologies and cultures, media environments, power and control, or valuation and assessment. Also, we can distinguish between explicit and implicit didactics, as we do for forms and processes of knowledge generally.

In the context of wide-spread media effects such as “dumbing-down” or “data smog,” microlearning and associated pedagogies may be seen by some simply as contributing to these undesirable trends. Although we believe that learning can be playful, entertaining and even joyful, we do not maintain that microlearning is simply a question of dressing up and manipulating avatars, or tinkering with bits and “pieces loosely joined” (D. Weinberger). It is easy to argue that neither differentiated knowledge and critical thinking nor social and moral competence necessarily emerge, simply because somebody may have learned to make use of RSS-feeds, wikis or weblogs. But which didactical principles and which educational experiences promote these qualities and competencies and what was and what is the role of educational systems in this respect?

Critical discussions about traditional schooling and hidden curricula, school influences, and governmentality (Weber & Maurer, 2006) in educational contexts have shown ambivalent results. In our view, microlearning always has played a role also in institutional learning contexts (cf. Hierdeis in this volume). The question is rather, *how* micro steps and short-term learning activities are positioned, situated, contextualized, valued, combined, complemented, contrasted, counterpointed, etc. and which forces are at work in institutional contexts and elsewhere. Generally speaking, besides incidental and unavoidable modes of punctuating and foregrounding single learning steps in flows of work and everyday life, there are many ways how the association of microlearning aspects can be conceptualized and linked to comprehensive models. Here are some examples:

- In the *multicomponent model* micro aspects or contents are combined more or less systematically - either in advance or on the fly - in sequences, linear, recursive and/or branching, relating to each other as separate components (e.g., Swertz, 2006).
- In the *aggregation model* microlearning elements that are fundamentally *similar* are bundled or combined as a relatively unstructured entity or homogenous mass (“aggregate”).
- In the *conglomerate model* diverse micro elements are arrayed as a kind of assortment or “bouquet” of learning products and processes.
- In the *emergence model* new phenomena, coherent structures and qualities evolve from and between microlearning elements themselves. These novel patterns or properties cannot be attributed to any single element. Instead, they arise out of a multiplicity of relatively simple interactions or steps in dynamic process of self-organization.
- According to Luhmann’s *medium/form distinction* (1997, pp. 190-201) learning results can be understood as *form* in a *medium* of loosely coupled elements. Because any given form can act as medium on another level, layers and layers of distinctions can be described. For example, we can create words in the medium of letters, sentences in the medium of words, and thoughts in the medium of sentences.
- In the model of *exemplification*, micro aspects of learning appear as prototypical examples which allow the explication of larger complex structures, connections and relations. Holographic depictions can be taken as special cases of exemplification.
- Furthermore, micro-macro-relations in learning processes also can be described and analyzed in terms of “perspicuous representations” *sensu* Wittgenstein (see Puhl & Seidl in this volume).

In relationship to these and other models, and also given the wide range of didactical theories and models (cf. Blankertz, 2000; Heitkämper, 2000) it becomes obvious that there are many different ways of conceptualizing, analyzing and designing didactics of microlearning. However, this variety of means also brings with it a range of implications in other spheres of value and activity. One of these that has emerged in discussions of microlearning is the sphere of politics, and it has become manifest above all in terms of network design and architecture.

4 Politics of Microlearning

Speaking of network openness, Mitch Kapor, the inventor of Lotus 1-2-3, insightfully observed in 1991 that “architecture is politics.” “The structure of a network itself, more than the regulations which govern its use,” Kapor argued (and has argued since), “significantly determines what people can and cannot do” using that same network (Kapor, 2006). Think, for example, of diagrams emphasizing the distributed nature of the Internet, with multiple nodes or routing locations connected in multiple ways with others, and with any one capable of routing additional network traffic should a neighboring node become unavailable. This is typically presented as opposed to centralized networks, such as those represented by the telephone system, with a single central node.

As it has developed, microlearning can be said to have brought with it a kind of political awareness and partly a politics which is nowhere easier to trace than in architectures proposed for its technologies and applications. This politics, moreover, is primarily a politics of the institution versus the individual. Certainly there are a significant number of contributions to the microlearning discussion that emphasize its relevance to existing educational institutions and practices, or that focus on applications or studies situated within given institutional boundaries (e.g., Newman & Grigg, 2007; Oliver, 2007; Schachtner, 2006). But these are outweighed by contributions critical of existing and traditional educational institutions and practices. This is evident in calls to go beyond “the institutional shackles of today’s state education systems” (Krieg, 2007), the questioning of the “sustainability of traditional models” (Fiedler & Kieslinger) or the outright rejection of “traditional pedagogies, frameworks and roles” as “ineffective” (Molnar, 2006).

But revolutionary rhetoric aside, diagrams such as those provided by Fiedler and Kieslinger (2006), Downes (2006) and Wilson before him (2005) make clear the difference between traditional and microlearning visions. The first diagram adapted from Fiedler and Kieslinger, (see Figure 2) for example, is illustrative of architectures associated with conventional “institutional” settings.

The diagram shows “participants” (the white circles on the right) as connecting to “forum,” “calendar,” and “content” tools or functions, which are supplied by a single, centralized Learning Management System (LMS). The diagram could just as well have shown these same participants as similarly connecting to the “email,” “conferencing,” and other communications tools. Additionally, it could have also shown all of these tools or functions as associated with a single Learning Management System, combining both content, calendaring and communication functions in a single, integrated suite of tools. All communication or connection between these participants, moreover, is ultimately mediated through these centralized systems.

This is precisely what the leading Web-based learning and teaching environments -WebCT, Blackboard and Moodle - accomplish. And they do so in such a way that they allow for the surveillance of online student activities in a manner that has been described as “panoptic” (cf. Rybas, 2007). As is the case in Bentham’s prison design, these learning management systems allow the behaviours of students to be visible to the teacher in individual and aggregate form, while the actions of the teacher are in no way open to such scrutiny (Land, 2004). In addition, the roles and actions that students and teachers are actually able to undertake are similarly constrained and standardized. “Bricks-and-mortar” institutions, like any other organizations, are “full of heterogeneous actors, with complex identities” (Pollock & Cornford, 2000). These are also developed, changed and improvised as necessary: students may lead a class, and may evaluate themselves and others. However, in learning management systems and organizational information systems generally, “everyone and everything is formalised, represented in a standardised form, with certain roles and responsibilities towards the system.” The result with such systems is that “we risk destroying or submerging those interactions that are tacit, informal, flexible” (Pollock & Cornford, 2000). Teachers are not learners, and learners do not teach; instructors or automated systems evaluate students rather than students evaluating

themselves, and all actions remain inauthentically isolated from real-world with a password-protected “garden wall.”

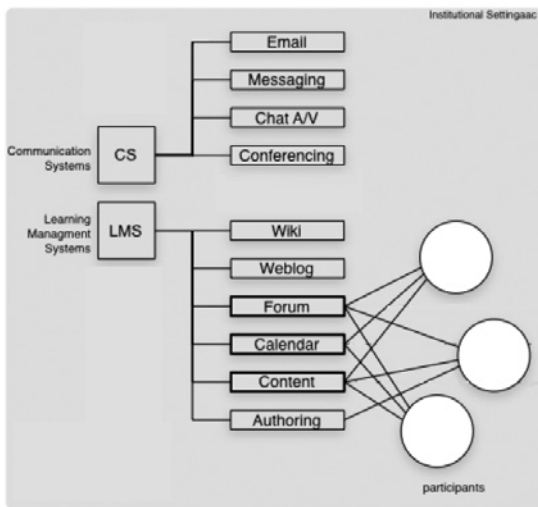


Figure 2. “Institutional Setting”
(cf. Fiedler & Kieslinger, 2006, p. 80)

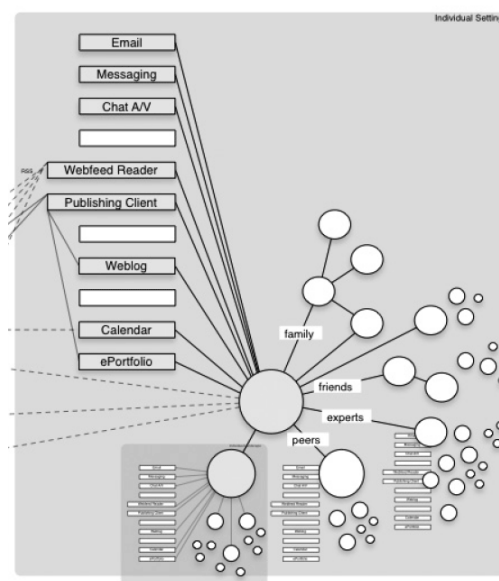


Figure 3. “Individual Setting”
(cf. Fiedler & Kieslinger, 2006, p. 81)

The diagram showing the “individual setting,” (Figure 3) on the other hand, shows a single participant at the centre, and a wide range of entities arrayed around him or her. These entities include not only the familiar institutional functions or tools for email, messaging, calendaring, etc.; they also include those sociotechnical developments most closely associated with microlearning, such as Weblogs, ePortfolios, RSS readers, etc. Significantly, many of these tools in this diagram are shown to be connected to related tools offered through a different “institutional setting” and the central participant in this diagram is also shown as connecting directly to other services or tools offered by this same institution (these connections are indicated by the dashed lines extending on the left of the figure; the entities to which they ultimately connect have been cropped in this version of the diagram). In addition to these tools (which are presumably still offered and centralized in a given institutional setting) the participant is shown as having direct contact with other “participants” - labelled as “family,” “friends,” “experts” and “peers” - outside of the institution, and involving no mediation by its systems or tools. These, in turn, are connected to further individuals, who bring along their own array of institutional tools and connections (as indicated by columns of institutional services or tools arrayed towards the bottom of the diagram). Of course, the politics of this second diagram are not those of institutional control, but of individual autonomy and self-direction. Specifically interrogating issues associated with the adult or “life-long” learner, Fiedler and Kieslinger describe a “technologically emancipated” education:

Do we expect adult students merely to adapt to centrally hosted and controlled landscapes of tools and services? Or do we rather maintain a perspective of (technological) emancipation, which suggests that adults should also control, at least partially, the tools and services that they integrate into their personal workflows? (2006, p. 85)

This is perhaps even more explicit in the descriptions and the diagram of the “Personal Learning Environment,” provided by Downes and mentioned earlier. The diagram in question, although not reproduced here, does not even provide a single institutional frame of reference. Instead it shows a central environment (a “Virtual Learning Environment” or a “Personal Learning Environment”) as connecting to some half dozen services and technologies, with institutions such as “Learndirect” or the Bolton Institute having the same diagrammatic status as Flickr or del.icio.us: “It becomes,” as Downes explains, “not an institutional or corporate

application, but a personal learning center, where content is reused and remixed according to the student's own needs and interests." Writing elsewhere, Downes is even more explicit:

It's just you, your community, and the web, an environment where you are the centre and where your teachers - if there are any - are your peers. It is, I believe, the future - and where, one day, the next generation of Blackboards and WebCTs and Moodles and Sakais will make their mark. (2006a)

Assuming that these kinds of statements take into account the complexity of the relationships between the technological and educational, it would be too easy to dismiss their substance as the product of either romanticism or desperation. The kind of emancipation-through-technology envisioned by Downes and others underplays the dependence of these activities on carriers, providers, division managers, infrastructures and more. Control of these infrastructures and services presupposes a significant level of economic enfranchisement and social integration, and technical and communicative competency. There are a large number of factors, in other words, that exist externally to the Internet, and that play a decisive role in determining the presence or absence. Assuming that all of these conditions are in place, the learner in his "personal learning environment" is still encumbered by various issues: How many bright bloggers, productive second lifers and erudite podcasters are there who have not been recruited to media industries, or would struggle to survive on their "virtual" incomes? What of creators and providers of quality content which is prevented from having its educational value realized due to regionalized educational policy? The mass use of social software, the dynamics of amateur content production and consumption, and the business models that have been developing along with them require in-depth investigation rather than continued celebration. Such investigation would require research into macro-level considerations (e.g., see: "Parameters of the New Global Public Sphere," Volkmer, 1999), into the meso-levels of institutional decision-making, and down to the micro-levels of individual mouse clicks and attention management. We are far away from conciliation of the heterogeneous desires of consumer and participatory cultures, wealth generation and employability in its neoliberal or critical versions, or the just distribution of recognition and educational opportunity. Neither self-referential blogging nor unquestioning implementation of institution-wide "Blackboardization"¹ present viable solutions. We would argue that we face better chances of success (or survival) if we at least partially abandon battles for attention or rankings for the sake of cultures of deliberative learning (cf. Schmidt in this volume) and encouragement of phronesis (Aristotle). By this, we refer to practical, situated and flexible knowledges and ways of acting: ones that are sensitive to context, and are able to change in keeping with changing circumstances, able also to take and support the appropriate actions and developments at the right time and place.

The discourses and diagrams of microlearning, however, have provided a place for articulating and sketching out visions of a politically progressive, post-institutional education. Ways and means of learning are envisioned as being freed - at least to various degrees - from the old ways, forms, structures and limitations. One potential challenge that arises from these developments, though, is that they blur the distinctions separating education from more generic information and service provision, creation and consumption. For it is in some ways the "bundling" of communication, content provision and other functions and tools that characterizes their current educational use. And, more importantly, it is the embedding of this use with institutional supports and funding, with communities of teachers and researchers, and with curricular structures and organization that distinguishes it from more generic communication and information access. To be fair, the authors cited above would likely counter that these are precisely the traditional limitations from which education needs to be freed. However, the tensions and issues that would be implied in such a debate might become clearer when they are considered further below, in the light of another important theme in the microlearning literature, pedagogy.

¹ "Blackboardization" is used as an idiom for processes of norming learning cultures, trivialization of complex issues, misleading of trustful users, selling an e-learning approach as mother-of-all e-education, normalization of restraints, and implementation of structural bondages by asserting one Learning Content Management system as proprietary solution of priority.

5 Microlearning Morphology

The pedagogy associated with microlearning spans a wide range of possible approaches, from emphases on its inherently “unstructurable” and improvisatory nature (Friesen, 2006) to approaches involving the specification of actions and activities from moment-to-moment. One striking example of the latter is by the relatively early contribution to a didactics of microlearning developed by Swertz (2006), and earlier, by his supervisor, Meder (2006). Going by the name of “Web Didactics,” this is an eclectic pedagogy, defined in terms of navigation, sequencing, and particular content types:

Web-Didactics does not offer a single instructional design model (e.g., Problem Based Learning, Tasks Oriented Learning) but a choice of didactical models, that were approved in the educational tradition. These models were specified concerning the granularity of the computer screen. (2006, p. 56)

Swertz explains that the granularity of content called for by the computer screen is relatively small, and that contents at this level of granularity need to be disaggregated (“decontextualized”) to form general knowledge bases, in which these contents are labelled according to specific knowledge types. These types include “receptive,” “interactive,” and “cooperative knowledge” (ibid., pp. 58-62), in which “receptive knowledge” is subdivided into “orientational,” “explanational,” “instructional,” and “source knowledge.” Swertz reasons that each of these types can be sequenced (generally in linear fashion) according to a number of “micro models,” including models he identifies as “abstracting,” “concretizing,” “theory-driven” and “problem-based.” Abstracting involves a progression from text through drawing and animation to video, with concretizing reversing this order. Omitting some intermediate stages, the problem-based model involves progressive moves from task and content through explanation and example to an activity and overview.

This overall approach - re-arranging small, recombinant resources to constitute given instructional sequences - will likely sound familiar to anyone who has been exposed to learning objects and technical e-learning standards. For similar processes have been envisioned as occurring with learning objects as they are “packaged,” “sequenced,” or “scripted” in linear, hierarchical and/or recursive order.

A similar emphasis on structure is evident in the development of applications for the integration of microlearning activities in workflows and everyday life stream as done in Innsbruck (Austria).² Based on the principle of making use of the use of media, time slots for small learning steps are created according to the individual use of technical devices and learning needs. There is, for example, a cell phone application usable for second language acquisition, designed to prompt the user at pre-determined (and also customizable) intervals with questions concerning vocabulary, grammar, phrases and basic comprehension in a foreign language. These intervals can be tracked to ensure that they are optimized in accordance with psychological studies in memory and retention. The result is a product which has shown some promise in early studies (Hagleitner, Drexler & Hug, 2006), and which can be integrated in new and interesting ways into everyday practices and routines. This is described as occurring almost “interstitially,” under the aegis of “integrated microlearning” (cf. Gassler, 2004; Hug, 2005; Gstrein & Hug 2006), a model which tries to cope with paradoxical demands: it is open, flexible and modular and - at the same time - allows the use of learning management functions,

² In the context of a collaboration of the Institute of Educational Sciences, University of Innsbruck, with the Research Studios Austria, which formerly was a division of the Austrian Research Centers GmbH, a server-client application and prototypical PC and cell phone applications particularly with regard to second language acquisition have been developed during 2003-2006. The applications research at the Research Studio eLearning Environments was supported by the Federal Ministry of Economy and Employment and the Tyrolean Future Foundation. A new mobile microlearning application has been launched by Yocomo.at, a spin-off of the University of Innsbruck and the Austrian Research Centers GmbH. Information on further basic and use-inspired research as well as on development of novel microlearning applications is available at <http://www.hug-web.at>.

and it enables concomitant learning embedded in workflows together with the development of knowledge architectures.

The level of pedagogical structuring entailed in this kind of interstitial, integrated microlearning is broadly comparable to a rather different pedagogy for microlearning articulated under the title: “The *Dr. Who* principle” (Newman & Grigg in this volume). Starting from the assumption that learning and microlearning are “inherently episodic,” the authors point to the narrative structure of the 30 minute *Dr. Who* episodes broadcast by the BBC from the 60’s to the 1980’s as exemplary for microlearning. The two key characteristics they identify are 1) The structuring of “content to fit the episode (and every episode with a cliff-hanger)” and 2) The delivery of “the episodes in appropriate time intervals.” Of course, the second point is reminiscent of the mnemonically optimized intervals utilized in integrated microlearning; and the episodic, narrative structure suggested in the first point, is at least morphologically similar to the short sequences suggested in the “Web Didaktik” of Meder (2006) and Swertz (2006).

If these organizational and broadly didactic strategies can be considered as at least a “partially structured” pedagogy for microlearning, they serve as a transition to those pedagogies which advocate an abandonment of structure and regulation, and an autonomous role for the learner. This is described widely in terms of “learner-centered” didactic and especially in constructivist discourse of learning (cf. Kösel 2003; Reich 2006). Also Downes clearly votes for learner- or student-centered pedagogy, requiring above all “the placing of the control of learning itself into the hands of the learner.” It is well represented by the likes of Freire and Papert, with Downes citing one of the latter’s statements on “game-based learning” (Downes, 2005) as follows:

The most important learning skills that I see children getting from games are those that support the empowering sense of taking charge of their own learning. And the learner taking charge of learning is antithetical to the dominant ideology of curriculum design.
(Papert, 1998)

Any explicit structure applying to this “self-directed” learning is minimal: “insofar as there is structure, it is more likely to resemble a language or a conversation rather than a book or a manual,” as Downes explains (Downes, 2005). The learner directs and decides the affiliations, links, contents, forms of guidance and direction (if any) that will be constitutive of the learning process - in some cases creating these him or herself. There is no pre-ordained structure, curricular, sequential or otherwise.

6 Microlearning Lessons

We argue that the as of yet inconclusive and polyvocal nature of microlearning discourse is a good thing, and should be cultivated and encouraged. Indeed, this openness and heterogeneity may well be, counterintuitively, the agenda of microlearning in the present age. Given the developing and decentralized nature of the technologies and architectures that are associated with microlearning, it seems unlikely that any kind of definitive consensus on microlearning theory and technology is likely to emerge. At the same time, the emphasis on moments, interstices, snippets, and fragments that is obvious in microlearning discourses generally is likely to remain important. It is the fragment rather than the Wagnerian *Gesamtkunstwerk* that is most suited to the Web, to the cell phone and to various forms of ubiquitous and mobile computing - and to the dispositions and pacing of 21st century life.

Similarly, the architectural politics and the various pedagogies articulated in the microlearning discourse also manifest productive tension and difference. Vital issues and questions about the institutions, traditions and practices of education are kept alive and open through this heterogeneity. It is in terms of this final issue of the political and pedagogical that this paper makes one final point. This is to argue for a preservation of institutional and structured pedagogies that are generally critiqued in microlearning. To argue for a completely “emancipated,” user- or learner-controlled educational architecture and politics as does Downes and Molnar (and to a lesser extent, Fiedler and Kieslinger) is to misapprehend the multiplicity of

roles of the educational institution. And invoking questions about the feasibility of educational institutions is not anything new.

Let us reference a 1958 essay entitled “The Crisis in Education” to make both of these points. In this piece, philosopher Hannah Arendt argues explicitly against the notion that public educational institutions are to be understood simply in terms of their overt educational functions - whether these are sufficiently student-centered, or up to the challenges of the present age. Schools and universities are not simply about their overt educational functions. People do not simply become effective knowledge workers or even autonomous individuals there. Instead, the school is also where society reproduces itself, where one generation takes over for another. Learners (above all children) are introduced into a world that is environmentally and politically broken, and for which their teachers, the generation handing it over, must be held responsible. Arendt argues that

In education this responsibility for the world takes the form of authority. The authority of the educator and the qualifications of the teacher are not the same thing. Although a measure of qualification is indispensable for authority, the highest possible qualification can never by itself beget authority. The teacher's qualification consists in knowing the world and being able to instruct others about it, but his authority rests on his assumption of responsibility for that world. Vis-a-vis the child it is as though he were a representative of all adult inhabitants, pointing out the details and saying to the child: This is our world. (1958)

This responsibility also exists in the undergraduate classroom and in the dissertation supervisor's office: We are obligated to say that this is the past of education and this is its present. Using a different frame of reference, this responsibility is also palpable in terms of the “big spike” and “long tail” that governs the world of the blogosphere. It is the burden imposed by the arbitrary way that things have worked out, or not worked out. It is sometimes called history or tradition. As Arendt argues, it takes the form of the authority that is embodied, however, poorly, in curriculum structure and that constrains the freedom of the student a pedagogical responsibility. It is this ongoing dynamic of history, rather than simply historical inertia or the arbitrary authority that will prevent the most radical versions of “personal” and personalized learning from being realized. The impulse to conceive of microlearning and education generally that is freed from these constraints is important and valuable, but it exists only to counterbalance the recognition of the inescapability of this ongoing predicament or crisis.

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