

# Is There a Space for the Teacher in a WIKI?

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## ABSTRACT

In this paper we ask to what extent collective cognition can be supported and sustained in classroom practices. One major challenge for learning in technology-rich, collaborative environments is to develop design principles that balance learner exploration with a more goal directed effort. We argue that teachers play a key role in such efforts and that educational wiki designs need to allow such a role in order to support group knowing. First, from an activity theoretical perspective we discuss teaching in knowledge collectives as new type of educational activity. Next, we analyze functions and meta level affordances found in the MediaWiki application. This is followed by a presentation of an intervention study in which the MediaWiki was used by a class of Upper Secondary School learners in Norway. Findings are used to discuss design principles for wikis that support collective cognition and where there is a place for the teacher.

## Categories and Subject Descriptors

K.3.1 [Computer Uses in Education]: Collaborative learning.  
D.2.2 [Design Tools and Techniques]: User interfaces.

**General Terms:** Design, Human Factors, Theory.

## Keywords

MediaWiki. Collective cognition. Teachers. Design development.

## 1. INTRODUCTION

“Two heads are better than one” is a saying repeated so often that we have come to take its claim as self-evident. The increasing impact of wikis in public spaces, commercial enterprise and education seems to testify to such a claim. However, what exactly is meant is not always clear. Is it the process we engage in when we collectively develop insights – here referred to as collective cognition – or is it (also) a type of synergistic competence that emerges as the result of combined efforts? Taking both interpretations into consideration, the crucial question for education is how collective cognition can be supported and sustained in classroom practices. We ask to what extent a wiki can be conducive to collective knowledge building and, in particular, if and how a teacher can take part in wiki activities. These are the primary concerns of the present article.

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We perceive collective cognition not as a static notion in the sense of a shared, widespread belief or social representation (in the tradition of Durkheim, 1898/1974; see also Flick, 1998) but as a dynamic concept, emerging when two or more people reach insights that neither could have reached alone, and that cannot be traced back to one particular individual's contribution (Giere, 2002; Oswick, Anthony, Grant, Keenoy, & Mangham, 1999; Stahl, 2006). It is a process of a group coming-to-know (Wells, 1998). The basic assumption is that fostering collective cognition can be conducive to solving problems too complex or demanding for an individual. As Hutchins (1995:262) formulates it: “All human societies face cognitive tasks that are beyond the capabilities of any individual member. Even the simplest culture contains more information than could be learned by an individual in a lifetime”. This observation is of vital importance when we look at education as well as working life in the 21<sup>st</sup> century (Mezias & Guth, 2001), which require people who develop expertise in the form of “the ability to work in non-routinized ways on ever more demanding problems in whatever domain they are confronted with” (Gee, Hull, & Lankshear, 1996:57).

However, while there are numerous studies of collaborative learning in schools (see e.g. Joiner, Littleton, Faulkner, & Miell, 2000; Koschmann, 1996; Ludvigsen & Mørch, 2005; Wells, 1999) there are relatively few that address the notion of collective cognition as we have outlined it above (one notable exception is Stahl, 2006). Even more uncommon are studies that address the teacher's role in fostering collective cognition. We address this issue by first discussing teaching in collective practices and where such practices involve collaboratively oriented technologies. This is followed by a discussion on functions and metafunctions found in one particular technology, the MediaWiki. Next, we report on an ongoing, interventionist study where the MediaWiki is integrated in a class of Upper Secondary School learners in Norway. Based on the (preliminary) findings, we discuss possible development of the MediaWiki and with particular focus on the role of the teacher.

## 2. TEACHING IN KNOWLEDGE COLLECTIVITIES

### 2.1 Collectives and classrooms

Socioculturally oriented perspectives on education have often taken Lave and Wenger's (1991) seminal metaphor “communities of practice” and how this involves gradual participation and enculturation as an alternative to the more cognitivist oriented “acquisition” metaphor (Hakkarainen, Palonen, Paavola, & Lehtinen, 2004; Sfard, 1998). However, exactly how the participation metaphor translates into educational practices is not

always obvious. Tharp et al (2000) propose five standards that sum up this basically Vygotskian notion of teaching:

- It involves joint productive activity in which learners as well as teachers are involved
- Literacy is developed in activities that cross the curriculum
- Learners' lifeworlds are sought bridged with subject matter
- Multiple perspectives and solutions are encouraged
- Guided classroom conversation and dialogue are encouraged

These five items, according to the authors, add up to a community of learners in which the teacher is included and is given a role as a more knowledgeable peer as well as a designer of learning activities and environments. We argue that although Tharp et al make a convincing case for the community approach to learning and teaching, there are two issues that need to be pursued.

The first is the role of the school subject. In activity theory (Engeström, 1987, 1999), activities are always motivated by, oriented towards – and even determined by – the object. In this case, an object would be a subject specific or inter-curricular task or assignment. But the object can never be realized fully, it is always evolving, opening up new horizons of possible actions as actors pursue it with diverse cultural tools and under different conditions (rules, type of community, division of labor). Also, the object is dual in nature; partly materially realized (e.g. the MediaWiki content and structure produced) and partly socially constructed (e.g. through the collective cognition that goes into the MediaWiki task). We argue that sociocultural and collective approaches to learning and teaching need to pay greater attention to the object of the activities in order to make a clear distinction between schooling and more general enculturation and development.

The second issue concerns technologies. As the following section will expound, the MediaWiki comes with affordances and constraints, with potential that does not determine classroom activities, but that can be realized through practices that represent something “new” in the sense that such collective and distributed practices have not yet been “didacticized” or become an integrated part of teachers’ professional repertoire. There are many reasons for this (institutional and socio-historical) but here we briefly touch upon two factors. The first concerns the nature of the group (Lindkvist, 2005) (in our case learners and teachers involved in wiki practices), the second concerns the notion of teachers’ “technoliteracy” (Lankshear, Snyder, & Green, 2000).

Lindkvist (2005) criticizes the community of practice notion for disregarding power issues and innovative potential. Based on studies of groups in organizations, he finds that there is a need to distinguish between a community of practice (CmP) and a collectivity of practice (CIP). The former is stable, longitudinal in scope, tightly knit, displays high degree of mutuality and shared understanding and repertoire. Relevant knowledge resides in the practices developed by this community. The latter is more transient and with less formalized structures, more individualized in the sense that there is a greater sense of distribution, more oriented towards developing new insights, and more oriented towards the object of the activities, less towards the cultural

practice of the community. Relevant knowledge resides in the network of agents (and, we would add from an activity theoretical perspective, cultural tools). There is no dichotomy between the two types of groups; for instance a CIP can evolve into a CmP and vice versa, they are more like two points on a continuum of collective knowledge construction.

Although Lindkvist’s typology is developed from empirical studies of organizations we find it to be useful when studying educational settings as well. But a class in school might be said to hold characteristics of the CmP as well as the CIP. In the face-to-face, co-located setting a class may over time develop communal activities as listed above. A teacher exhibiting professional expertise will typically design tasks, prepare resources, orchestrate activities and often assess them. All the time, there will be a teacher presence, although it might sometimes be subtle and sometimes up front it constitutes perhaps the primary social resource for learners, not unlike the master – apprentice relationship so typical of the CmP notion. While this relationship may be temporarily suspended during periods of project or group work, it does not challenge or transcend the socio-historically established practices of the classroom. Also, the teacher provides support for individual as well as collective cognition in the form of flexible scaffolding among the more rigorous regulating mechanisms found in e.g. the curriculum, exams and textbooks. In sum, the teacher continues to play a crucial role also in the more community oriented practices of the classroom.

The challenge emerges when available resources increase in number, when the learning environment is expanded, and (therefore) the classroom discourse is transformed. There is, however, no direct causality between technologies that are introduced and the practices that follow, as numerous studies have shown (see e.g. Bax, 2003; Ludvigsen & Mørch, 2005; Lund, 2006; Schofield, 1995; Warschauer, 1999). It is the reciprocal impact of and tensions between institutional practices and available material and social resources that mediate educational activities. This explains why for instance Learning Management Systems have tended to remain repositories for instructional material and learner management tools despite some communicative and collaborative potential. If we are to understand how technologies (may) affect and ultimately improve learning and teaching, we have to address the total ecology of schooling.

## 2.2 New activities?

This takes us to Lindkvist’s second type of community, the collectivity of practice (CIP). As networked technologies continue to infuse schools the available communicative and semiotic budget increases, we experience an extension of cultural tools (Ludvigsen, 2005) which, in turn, can be adapted to existing practices or mediate new ones. In the case of a wiki, its structure shaped from within by the authors, collective authorship, opportunity for promiscuous interlinking, lack of ownership to contributions, and permanent non-finite state (Désilets, Paquet, & Vinson, 2005; Lamb, 2004) seem to dovetail with Lindkvist’s notion of the CIP or Knowledge Collectivity.

We know little about how teachers negotiate such environments. From studies of teachers working in more established types of technology rich environments (Internet searches, discussion forums, LMS) we see that they struggle to integrate emerging practices in schooling’s compartmentalization of subjects and

their consecutively arranged slots in the school day and week. Some succeed while some abdicate as the nature of the school subject (ontology) changes, how we come to know the subject (epistemology) changes and the underlying activity system of teaching is transformed, albeit incrementally (Erstad, 2005; Lankshear, Snyder, & Green, 2000; Lund, 2004, 2006). The kind of “technoliteracy” involved is intimately linked with the social practice of teaching and less with instrumental mastery of applications. This is very relevant when considering the wiki’s deceptively simple user interface but its profound potential for a collective epistemology.

It would seem that for a teacher working in and with collective knowledge building a wiki is aligned with a CIP approach. However, the teacher through her/his participation in the CIP would have to maintain a precarious balance between by on the one hand showing commitment to the object of the wiki activity and, on the other, endorse the promiscuous linking and interlinking, the *ad hoc* and serendipitous construction process. Also, in collective activities that involve spawning ideas there is always a danger of some participants free-riding (Barki & Pinsonneault, 2001). In order to develop a collective zone of proximal development (ZPD) and not just a situation in which a more knowledgeable peer assists an individual (Daniels, 2001:67-68; Vygotsky, 1978:86-87), a teacher would also need a wiki space that facilitates the construction of a collective ZPD.

The practices indicated in this sub-chapter will be pursued in the following sections on the MediaWiki and the report on the empirical study. To what extent such practices can be considered “new” in the sense that they are conducive to expanding the object of an activity (Engeström, 1987) and developing new insights (Lindkvist, 2005) will be brought up in the ensuing discussion. Here, wiki design will be linked to facilitation of teacher presence and sustainability of CIP practices and collective cognition.

### 3. EDUCATIONAL USE OF WIKIS

The original wiki (WikiWikiWeb) was created and conceptualized by Cunningham in 1995 as a “freely expandable collection of interlinked webpages, a hypertext system for storing and modifying information – a database, where each page is easily edited by any user with a forms-capable Web browser client” (Leuf & Cunningham, 2001:14). The design is considered highly democratic, in the sense that every user has exactly the same capabilities as any other user (Carroll, Guzdial, Holloway-Attaway, Rick, & Walker, 2002), and that a wiki encourages and facilitates user collaboration, accumulates users’ opinions, and cultivates active on-line communities on the web (H.-C. Wang et al., 2005). Based on (and challenging) this ideal, wikis have been developed to meet a plethora of application areas, targeting public, protected or enterprise uses, such as support for collaboration in project groups (e.g. Twiki), collective content management (e.g. DocuWiki), agile software development (Trac), enterprise uses (Confluence), and (probably the most widely known wiki) Wikipedia, the free on-line encyclopedia that anyone can edit (MediaWiki).

There is a growing interest in the educational uses of wikis. Schwartz et al (2004) discuss features and selection criteria for wikis used for distance learning in general and claims that the full potential of wikis remains to be realized in this domain. C.-m.

Wang & Turner (2004) propose extensions to wikis in order to make them more suitable for classroom use, e.g. page locking (to avoid learners losing their contributions due to concurrent edits) and access control (to protect certain pages such as the syllabus and to provide private spaces for the learners in the wiki). Similar experiences are reported by Raitman, Augar, & Zhou (2005), who discuss pros and cons of wikis in an online collaborative e-learning environment. Augar, Raitman, & Zhou (2004) have used MediaWiki to enhance social interaction among students online, e.g. in an icebreaker assignment. They claim authentication and tracking are required for wikis to be suitable for teaching and learning online.

Bruns & Humphreys (2005) report from a project (M/Cyclopedia) using MediaWiki at university level in a new media technologies subject. This project has a lot in common with ours. The technology is the same and the assignments are based on similar ideas of letting the learners co-construct subject entries in an encyclopedia. We will relate our experiences to those of M/Cyclopedia in the discussion.

MediaWiki is written mainly to run large open-content sites like the Wikipedia. The features of MediaWiki are not developed with planned or designed learning activities in mind. However, we argue that many features of MediaWiki are well suited to support learning activities in classrooms, as MediaWiki has many of the features that many report are missing in the original wikis (Augar, Raitman, & Zhou, 2004; Raitman, Augar, & Zhou, 2005; H.-C. Wang et al., 2005). These features are currently being introduced as part of our intervention, and are described below. Based on our experiences, we will propose some changes and additions to the feature set to better support learning activities (cf. section 5).

#### 3.1 Main features of MediaWiki

The MediaWiki is a response to the idea of a collective effort to produce and maintain a free encyclopedia, in which anyone can contribute. Creating/editing text and adding/restructuring pages are done in a browser. Usually no special requirements are made on operating system or type of browser. Pages are written using a wiki markup, which is a simplified alternative to HTML.

Collaborative features include logs and notifications that enable a community to keep track of edits for each page (who did the edits and when). Features also include possibilities of rollbacks to earlier versions and display of differences between versions.

While these features have become quite common in wikis, a special feature of the MediaWiki is the discussion page that is associated with each topic page or “namespace”. In Wikipedia the discussion page serves at a meta level as a place for negotiations for the content matter in the encyclopedic entries.

#### 3.2 Teachers’ space?

There are two levels of users in MediaWiki, normal users and administrators. *Normal users* can: add, edit, move and rename pages, upload files etc., while *administrators* can protect pages from editing, delete and undelete pages, edit protected pages, ban users by IP address, ban users by username etc.

These levels are not designed to reflect the normal needs of teachers, who find they have the same amount of power in the wiki as any learner. This is a rather different approach compared with Learning Management Systems (LMS), where teachers have

an explicit role as organizers and facilitators of learning activity, distributors of learning material, assignments etc.

The wiki approach places new demands on the teachers. For example the meta level features of MediaWiki can affect teaching in the following manner:

The *discussion page* is a place for the teacher to be present in the online activity, and may be used as a space to facilitate discussions about the subject matter in the assignments, e.g. by asking questions, provoking learners' opinions, suggesting information sources, suggesting more depth in the entry etc.

The *history page* is another place for the teachers to get valuable information about the emergent learning process, e.g. by observing who is active and when, how many are active, the collaborative nature of the edits, the rate of new topics compared to the improvement of the existing, etc.

MediaWiki has a set of *banners* that may be used to signal a request for work on a given topic. Some of these banners are automatic, such as the stub-banner (indicating that an article is short, and needs more work). Others are for manual inclusion on a page, e.g. to request a topic to be presented in accordance with a template.

*Special pages* display various aggregated content based on functionality embedded in that special page. These pages are important because they provide awareness (e.g. for new topics or wanted topics), navigation help (e.g. list of categories), and maintenance needs (e.g. pages with dead ends) etc.

## 4. WIKI IN THE WILD

### 4.1 Setting

In this section we report on an ongoing, longitudinal intervention study at an Upper Secondary School in Norway. Through a series of interventions researchers from InterMedia in cooperation with teachers at the school aim to develop practices and activities conducive to learning, and in which digital and networked technologies play an integrated part. The project includes four researchers and several teachers and classes. Here we focus on one class (31 learners, age approx 17) participating in the mandatory foundational course in English as a Foreign Language (EFL). Each learner has access to a laptop hooked up to the internet via a wireless broadband connection.

The MediaWiki was introduced as a technological intervention in October 2005, and continues to be used as of this writing. Consequently, there is a preliminary quality to the analysis and discussion, especially in the second project (section 4.3.2 below).

The rationale for introducing the wiki can be found in the school's collective approach to learning. Group work is common and teachers and learners develop project ideas through a particular forum for Planning, Execution, and Assessment (PEA), which handles brainstorming and idea generation as well as strategies for peer group assessment. However, there was no collaborative technology that seemed to support such practices, the LMS tended to be used for administrative purposes only. The EFL teacher is used to working with an LMS and standard software, but does not have any previous experience with a wiki.

### 4.2 Method

The empirical data corpus includes the following:

- One audio taped lesson when the learners were first introduced to the MediaWiki
- 10 videotaped lessons (so far) in which the class worked on two different projects, one project spanning two weeks in November – December 2005, and one starting in February 2006 and ongoing. This constitutes the primary data.
- The growing MediaWiki content: pages, links, and comments.
- Written response from 27 learners to a questionnaire asking learners about their experience with the MediaWiki from the first project (made available through the LMS).
- Additional field notes from teacher and researcher planning and assessing activities together.

The analysis of the primary data builds on methods for analyzing situated, distributed, and multilevel communication in real time (Jordan & Henderson, 1995; Roth, 2005). Such communication involves talk, gestures, wiki authoring, and a number of tools from search engines to word processor and bilingual dictionary. It is therefore important to acknowledge the reciprocity of the semiotic layers that constitute the communicative activities; they are complementary elements in the knowledge construction processes.

## 4.3 An analysis of two consecutive projects

### 4.3.1 "Our USA"

For the fall term 2005, the class in question had focused on the USA, as it is one of the primary topics in the national curriculum. In one of the PEA meetings, teacher and learners decided to pursue this theme, but by employing the MediaWiki to construct the young learners' collective and multiple perception of the US - hence the title, "Our USA". This work was carried out over two weeks, altogether eight lesson, each of 40 minutes duration. Some learners also added material outside of school hours. From the outset the teacher emphasized that the learners should exploit the wiki's editing facilities for content as well as language improvement.

On the opening page of the project's wiki page, the teacher had written the double purpose of the production:

1. It will be our collective memory of what we have learnt about the USA. This will serve **us** in our English studies
2. It will be our collective and developing view of the USA. This may serve **you** who want to know how young Norwegians perceive the USA.

The project can thus be said to combine the encyclopedic characteristics of the WikiMedia with a more personal. "lived" approach". Although the wiki at this point in time could not be accessed by outsiders, item two (above) addresses a potential outside audience.

Analysis of the videotaped material shows three main types of activity: learners' production of the networked content, the instrumental mastery of the WikiMedia application, and strategies used to construct the wiki representation of their topic. This constitutes the three typical activity structures in the project. At first, they emerged as separate and consecutive activities with

different objects, but as the project progressed learners gradually oriented themselves toward the compound object of learning content embedded in learning resources with a networked structure. This gradual shift takes the learning community of the class in the direction of Lindkvist's notion of the CIP. At the same time, it involves an epistemological shift in the sense that the learners did not encounter some finite subject matter in the form of a textbook, but collectively constructed a subjective and "rhizomatic" representation of the subject matter.

From the beginning there was intense production of categories as well as budding and branching. Typical main categories would include US history and US Government but also less "official" items such as cars, bands, movies, and famous people. Learners usually worked together in pairs or threesomes on a category of choice. For example, one dyad developed a space on "soaps" that managed to bind together typical traits (cliffhangers, the evil family member etc) with the expectations of the audience and examples of such series. Another group of three learners worked out an extensive contribution on Weapons of Mass Destruction, hardly a subject from their textbook.

However, it soon became evident that learners preferred to go on creating extensions indefinitely at the expense of rewriting, improving and editing one's own or a classmate's contribution. Learners did not immediately embrace any notion of collective ownership or epistemology but continued a practice where the institutionally cultivated individual ownership persisted. Consequently, the teacher intervened and called for a change in focus, asking learners to concentrate on the collective improvement of the wiki space and be parsimonious about expansion. The log that tracks all the contributions shows a decrease in budding and an increase in revision. This experience of gradually experiencing collective knowledge building seems to be attributed to the teacher's intervention. Still, the class needed to be reminded about this during the finishing stage of the two-week project. Many were reluctant to interfere with "somebody else's material", as they put it. When they did, it was more on a language level than a content level. This, of course, is in itself extremely interesting in view of the subject of foreign language learning.

In their responses to the questionnaire, learners articulate their perception of this experience. Their views reflect a gradual sense of collective enterprise, just as the history of the wiki pages show.

For instance, asked what they liked and disliked about the wiki's structure allowing for multiple authorship and editing, the response was distinctly positive (25 positive statements, 13 negative). Typical for the positive experience were statements such as<sup>1</sup>:

- I like this because we so easily can compare and share information on what we know and what we do not know about the American way of living
- I like this because it is a win/win situation. To help others and get help back is nice. Co-operating is very important in our daily lives and our future jobs!

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<sup>1</sup> All responses are copied exactly as they appeared on the submitted questionnaire.

- The subject will be shown from many persons view and not from one singular person [...] I feel like part of a team

On the whole, the positive responses center upon the aggregated output as a richer and more reliable representation than a collection of individual contributions.

As for the more negative statements, they are much more unison in their concern for abuse or inexpert editing. The following statement is typical:

- Someone can change what you have written, even when you know that what you have written is correct.
- My texts got deleted

These five statements reflect a tension between writing practices that, on the one hand, rely on private ownership to and control over learners' contributions and, on the other, practices that exploit collective and distributed power structures.

As documented in section 3.1 (above), the MediaWiki affords several opportunities for handling such tensions through meta level features that can ease the process and resolve possible conflicts of interest. However, from the "Our USA" space we see that learners only to little extent made use of the meta functions. When they do, it is mostly to challenge another's contribution, for example in the case of Lill who writes "What is the point of having a link called 'animals'? Is it really relevant?" But sometimes a learner would make use of this opportunity to raise a controversial point. Karen writes nearly a complete essay on US society, linking up topics from slaves to Michael Moore. Space allows only the introduction, links are represented with words in double brackets:

When I look at [[The USA]] I think that they are so extreme in every direction. They got their big companies that have spread out to the whole world like [[McDonalds]]. Since the USA is so big, there are a lot of different opportunities in the country. The "American dream" is still alive for many people.

During the two weeks, the MediaWiki was left to the learners alone. The teacher played an active role in the co-located setting. Mostly she walked around helping learners with getting good points across, structuring content, and sometimes offering advice on terms and phrases, sometimes she faced the whole class and reminded them about the nature of the assignment, and sometimes she demonstrated a page in progress with the help of a computer linked to the internet and to a projector so that the class could have a large view of what she wanted them all to see.

In sum, the first project demonstrates in embryonic form an emergent collective and networked practice but at the same time that this does not come about by just deploying a collaborative tool. Traditional practices are obviously challenged. So is the individual epistemological position schools traditionally have assigned to the learners. Consequently, the teacher and researcher discussed possible changes to introduce into the second project. They can be briefly summarized as follows:

- Change in task. Tasks that are suited to individual and co-located settings may not necessarily align with collective and distributed settings. According to O'Neil, Chuang, & Chung (2003) we need to design assignments that take collaborative problem solving as a

point of departure. This involves producing a result that amounts to more than the sum of its individual contributions and that cannot be reduced its separate parts.

- Change in teacher practices. It was evident that while the teacher could expertly assist learners in co-located mode, she abdicated from the networked activity. Thus, a most important structuring and regulatory mechanism is lost in one main type of activity. For the next project, we aimed for a more active and persistent teacher presence, especially by her using the meta level features and not so much the pages devoted to content.
- Change in time, space, and pace. It would seem that fairly intense and short-term use of the wiki did not align with its potential for reflection, revision, and carefully developed network structure. In their response to the questionnaire on what to do differently the next time, several learners pointed to the need for more time, and one specified the need to “Maybe have a little more time to watch/improve our classmates article”.

These issues added up to the intervention that guided the second project.

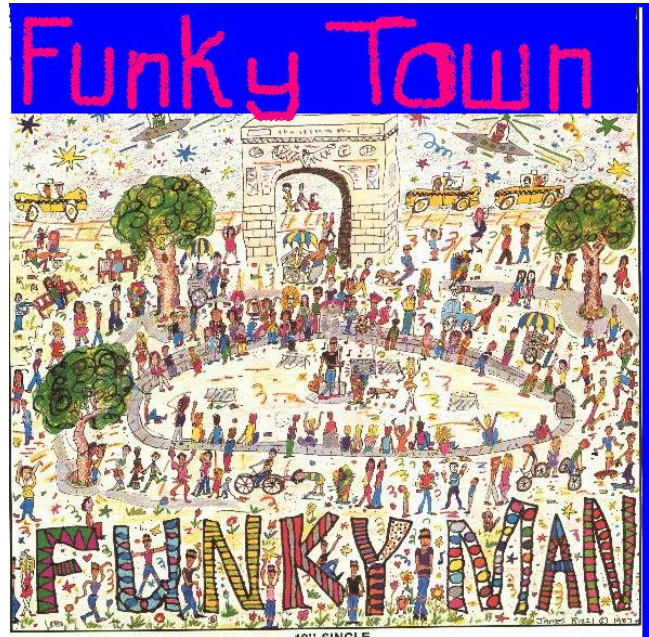
#### 4.3.2 “Funkytown”

For the spring term 2006, the class in question focused upon the UK. The Norwegian target oriented national curriculum identifies certain topics to be covered such as UK Government, History, Culture, and Education. Based on the three changes that conclude section 4.3.1 teacher and researcher presented the class with a slightly different type of assignment. First, the MediaWiki should be used to build a typical, but fictional, British town. The purpose was to achieve a greater sense of collective object while at the same time linking the object to the school subject in question (cf. our comments on collectives and classroom in section 2.1). The town would thus gradually evolve as the class encountered the topics in the curriculum and transformed their perception of these into the town’s location, history, population, and distinguishing features. As such, the town would emerge as an object in its own right while simultaneously serving to mediate learners’ coming-to-know about the UK.

Secondly, the teacher should convey a presence in the wiki environment as well as the co-located classroom in order to provide prompts, structure and direction. The MediaWiki’s discussion space should facilitate such presence. At the same time, other meta features in the MediaWiki such as automatic notification about updates and need for restructuring should be utilized to greater extent. The latter type of structure is predetermined and rigid while the teacher presence was intended to serve as a more flexible and accommodating regulatory mechanism.

Finally, instead of a concentrated effort over e.g. two weeks, this second use of the MediaWiki would run for the whole term. One consequence is that learners’ contributions to the wiki to greater extent were made outside of lessons devoted to the EFL subject. We assumed that a more longitudinal, distributed, and unhurried activity structure would be conducive to fostering the CIP as well as the CnP dimensions of collective cognition.

Through a brainstorming session learners decided on the name of “Funkytown” (pop. 500.000) as well as numerous categories that would mark the point of departure for the project of MediaWiki town building. There was intense activity from the start on March 2, 2006 and at the time of writing (early April 2006) 18 categories are found at root level ranging from Location to Town Anthem and The Average Funkytownian and all except two with numerous branches.



**Figure 1. Learners’ conception of Funkytown as illustrated in the MediaWiki page on Funkytownians**

To get a flavor of the town concept, the following excerpt from the Entertainment section shows how text, links and pictures (not shown) add up to a fictitious but realistic world including its distinct currency – “the ‘duun’ (...) similar to the old English penny”.

Are you new in [[Funkytown]] or are considering going there? Well, you have nothing to wait for, this is the opportunity of your life! With our great bars, such as [[Old McKinleys]] (see picture) where they serve pints for under a [duun]\*! Stop by for a chat with our local bartender Inga Magnusson (bartender to the right on picture)! Not here for [[drinking]]? Then we have the perfect solution for you and your partner! [[Old McKinleys]] represent a bar show, every Saturday night! It’s simply a must for tourists!

However, while the new type of task seems to have resulted in a more cohesive and collective product than the “Our USA” project, there is still reluctance to make use of the meta level features. For instance, there is so far only a handful of comments such as this one, critiquing a page on Funkytown’s shady Southside for being too “Americanized”:

I think you should swap the american gangsters with some more typical englishmen. More like the characters in the Football Factory movie.

The use of the meta level features seems to be conducive to the quality of the process as well as the result where it appears. However, it seems that this kind of activity does not appear automatically but needs prompting and cultivation over time. This calls for flexible and knowledgeable support, and this is where we would like to see a more pronounced teacher's presence in the wiki space.

Although one of the intentions behind the Funkytown project was to facilitate a teacher presence this has so far materialized only occasionally. When it does, it is usually in the form of questions aimed to elicit more precise categories or namespaces from learners. So far, the teacher seems reluctant to engage in activities that constitute the construction of Funkytown and the language that mediates such construction. Identifying tensions and contradictions in the activity system that makes up teaching at the interface of the classroom and the MediaWiki is a major concern for the next stage of the research project. In section 5 (below) we make a tentative analysis of this situation and suggest design principles for the MediaWiki that may ease the teacher's participation in and development of such networked activity structures.

### 4.3.3 Technicalities

Finally, a note on the technicalities that had a direct impact on the activities in the two projects. One section of the wiki was devoted to questions and answers of more technical matters. Although this issue is addressed in the form of a separate MediaWiki article (namespace), it has a meta level function. As the wiki grows, the problem of learners renaming pages (identified by Désilets, Paquet, & Vinson, 2005) is increasingly felt. It causes the renamed page to appear empty, and participants lose sight of the global, networked structure. A related problem emerges when a page in the Funkytown project is linked to what is intended as a new page but with a name that is already used in another project. For instance, a link to page called "Sports" automatically calls up an already existing "Sports" page from the "Our USA" project. Learners who are familiar with hyperlinks and networked environments (and they are quite a few in this class) can spot and correct such malpractice. This kind of monitoring seems to be beyond the capacity of a teacher, and would ideally be a case for the participants' collective "SoftSecurity" based on reciprocal responsibilities for the quality of the work (Lamb, 2004).

## 5. DESIGNING THE TEACHER INTO THE WIKI

There are a number of discussions about the role of the teacher in new online collaborative learning environments. We will concentrate on two here: 1) The facilities that teachers may use for planning and designing learning activities and how such activities can be enacted in wikis, and 2) the teacher's role in a emergent, yet sustained community of learners both co-located and online.

### 5.1 Planning activity in wikis

An inherent part of being a teacher is to plan learning activities. The nature of these plans may be challenged by the emergent use of wikis as reported in the literature and as we have observed in our study. While teachers have a good grasp of how co-located activities may be planned and structured, the competence pertaining to the online activity is less developed (and has just

recently become an integrated element in teacher training in our country). In our case the teacher enforced her design and enacted her professionalism in the social space, but did not do so to the same extent in the wiki. As we have pointed out there are features in the MediaWiki for teachers monitoring learners' activities. In the literature there seems to be consensus about making use of facilities for authentication and logging when using wikis in education. We ask whether such monitoring facilities are sufficient for teachers.

In our case the logs reveal that the meta level discussions were sparse, that topics usually had only one primary author (other learners typically only corrected spelling errors), that new topics were often added, and that adding links represented the typical evolution of a text. We believe these indicators are important for the teacher, and want to develop the logging as a means for teachers to know more about the learning processes involved. This is subject for further development and experiments, and in which visualization and other means for displaying patterns over time may be important.

Another aspect of planning is to facilitate learning by designing and enforcing certain activities, e.g. in inquiry based learning, a cyclic process of asking, investigating, creating, discussing and reflecting which is supposed to foster the object-oriented activities of the learners. There is a question whether such designs should be inscribed in the wiki (and to what extent), or just be socially enforced by the teacher in the co-located space outside the wiki.

We have found no reports in the literature on how activities should be shaped, planned or enforced in a wiki, with one exception; Fernandez (2004) suggests scaffolding for distributed software development. In his wiki (called Scaki) updated information about the state of the project and the allocation of persons to the different activities are available for all users. Users consult the wiki to identify activities that require their participation and change the status as the work progresses.

A complementary position was introduced by Suchman (1987) who discusses the relationship between plans and situatedness in human activity, and concludes that plans may act as resources for the work, and may be important even if they are not followed.

This indicates for us that some means of inscribing a plan for a learning activity in a wiki is an interesting research area. Our future work includes development and experiments with a wiki that has concepts borrowed from IMS Learning Design (see e.g. IMS Global Learning Consortium, 2006). How can such features afford the inscription of certain activities and what is the role of the teacher in more structured learning activities? Are such inscriptions in conflict with emergent communities (CmP) and collectivities of practice (CIP)? The authors are currently investigating these issues.

### 5.2 From Collectives to Communities

Working collaboratively in a wiki presents significant changes for the teachers and learners. The Neutral Point of View (NPOV) policy of Wikipedia requires all sides of an argument to be presented on a topic page, thus avoiding biases in the description of a given topic. Bruns & Humphreys (2005) discuss how the NPOV policy was used in an assessment to put new demands on the learners to negotiate the content and resolve their arguments in order to reach consensus about a topic that is collaboratively

developed. This served as a means for developing critical thinking skills in students, and was a challenge in terms of the learners letting go of ownership and attribution of work.

In our study we did not introduce the NPOV policy, but instead carefully designed the second assignment to be genuinely collaborative. In both cases there have been a shift in epistemological positions. The introduction and use of wikis have challenged the idea of an individual who is an autonomous knower. Teachers now face humans who engage collectively in activities that dynamically create and change objects.

It is in such activities we see future practices that are expansive (Engeström, 1987), that transcend the limitations of the solitary learner and make it possible to foster and ultimately draw on the potential of collectives engaged in knowledge creation. Also, in our study as well as in the case described by Bruns & Humphreys (2005) there is a notable shift in terms of a move from the learners being a collectivity of practice to being a community of practice. For the teacher (and the school as an institution) this implies challenges for the teacher role. Based on our recorded material and talks with the teacher immediately during the projects described above, we can sum up the challenges as follows:

- Working with wikis involves an epistemological shift, from individually acquired to collectively created knowledge. From the wiki it seems teacher would need carefully developed features that make it possible to find out which learners are working with which text at the same time. Then, accessing, monitoring, prompting, and – if necessary locking – a page will bring the teacher closer to the collective production, and assist and scaffold productive interactions among learners.
- It follows that the teacher’s professional repertoire is expanded. Planning lessons, a traditional hallmark of teacher expertise, need to be extended to *designs*. By design we mean the multiple configurations of offline and online activities and where such activities involve the many possible interactions between human and non-human resources. Such designs also involve carefully constructed tasks and assignments that are irreducible to individual problem-solving. With wiki features as outlined above the teacher, in turn, will need to design herself into these activities and configurations.

Acknowledging the importance of such challenges we argue for the development of a place for the teachers in the wikis. Today, teachers may find themselves lost in the online environment because the more common structuring functions of LMSs are not found in wikis. The standard LMS features may not even be relevant for the kind of teacher role that we see the contours of in our study.

## 6. CONCLUSION

In this article we have discussed the teacher’s role in fostering collective cognition as part of a classroom practice. We did this by presenting two interventions in a class of Upper Secondary School, in the subject of English, where we introduced MediaWiki as a collaboratively oriented technology. The two interventions were operationalized in the form of two different assignments. The first focused on learners’ understanding of the USA, and was developed mainly through dyads or small group contributions to a collective object in the wiki. The second,

“Funkytown”, was given as a more genuinely collective task, which forced the learners to collaborate and negotiate in the shaping and writing of the contributions.

Although the second of the two assignments aimed to give the teacher a more active and persistent role in the online knowledge construction processes, findings show that this role requires further support from development of wiki designs. The teacher has mainly been fostering the pupils’ activity in the wiki by social means, e.g. in the intervention midway in the first assignment asking the learners to focus on the improvement of the existing topics in the wiki space, instead of opening up new topics.

The study indicates that the activity structures that go into knowledge construction in a wiki represent a fundamental shift from the institutional and socio-historical practices that traditionally have served to foster individual knowledge construction or problem solving. It seems that there is an epistemological shift involved that has major implications for classroom practices. This issue can only be resolved if schools, teacher education and in-service training address questions of collective cognition.

When learners and teachers engage in collective cognition and across online as well as offline contexts, multiple activity structures come into play. For teachers, the complexity of the learning environment increases dramatically. At the same time, the practices we have examined point to the need for a teacher’s space in the wiki. This space is not a fixed position in a structure but is an activity space in which wiki features make it possible for the teacher to trigger, stimulate, monitor and guide online as well as offline activities conducive to learning. How to develop such activity spaces is a question that guides our continued research on the educational use of wikis.

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