Creative Learning Formats in order to integrate Social Media and Mobile Devices into Classroom Teaching

Abstract— **In this paper we study the phenomenon of mobile devices and social media which are nearly 24/7 used by students but actually are not yet really integrated into classical classroom teaching. In this connection we also speak from so called 'seamless learning'. We think that these tools have become an integral part of life and hence shall not be banned from classrooms but should become an integral part of the teaching process. We will show some creative approaches how this can be done by every teacher independent of the subject.**

Keywords— *Social media, adaptive learning formats, dynamic learning formats, mobile devices*

I. INTRODUCTION

Mobile devices and social media are used nearly all the time by students. On the other hand only few teachers take advantage of them. In particular many teachers complain about the permanent usage of mobile devices within their classroom lectures. They say it distracts students from listening to the teacher and hence from learning. We think that mobile devices and social media tools have become part of the life of the students. Hence to try to ban these devices from the classroom will result in dissatisfaction of the students. Within this work we want to raise and discuss creative ideas how to actively integrate mobile devices and social media into classroom lessons and home work. We want to give teachers practical hints how to seamlessly integrate mobile devices and social media into teaching independently of the subject.

II. STATE OF THE ART

Already as early as in 1999 the term web 2.0 was first used, and was popularized in a conference late 2004 (known as the O'Reilly media conference) [1]. In brief Web 2.0 does not describe a technical upgrade of the web but actually a new usage in terms of involving the users in generating and distributing content in contrast to just viewing content. Hence users turn from pure consumers to so called "pro-sumers" (production and consumption).

Social media tools build on top of Web 2.0 tools by enabling users to create and exchange ideas in terms of pictures, videos and text in virtual communities. In connection with integrating mobile devices and social media tools into the learning process the term "seamless learning" is recently very often used [2], [3], [5]. Seamless learning bridges private and public learning spaces where learning happens as both individual and collective efforts and across different contexts (such as in-school versus after-school, formal versus informal) [4]. Hence our primary focus within this paper lies on learning formats which seamlessly integrate social media tools into classical teaching.

III. FACTS AND FIGURES FROM OUR UNIVERSITY

We started our work based on the results of two surveys which have been made amongst our students. Both surveys are repeated every year with (nearly) the same questions in order to see the changes over the time. We started with these surveys in 2013. The first survey is done amongst students starting their study. Here we evaluate the technical infrastructure and the social media tools they use and for what purpose. As for the basic facts: we performed this this survey online with 419 students in the first semester, 349 answers were returned. This results in a return rate of 83% which is a very result good for an online survey. 53.4% were male, 46.6% were female. 95.1% were in the age between 18 and 25, 4.3% were in the age between 26 and 35 and 0.6% were older than 35.

The first results we want to present refer to which devices and which Internet access is used.
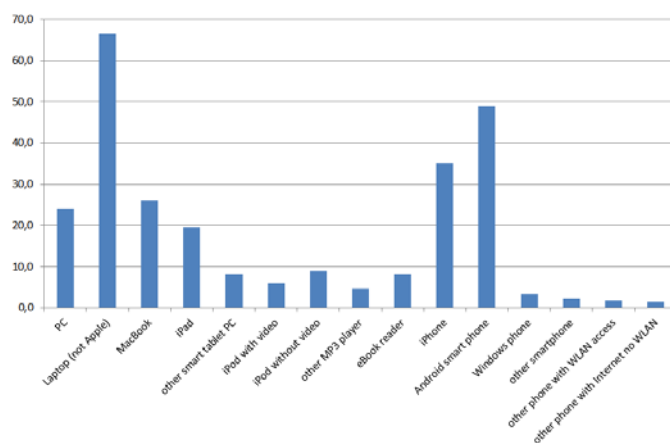

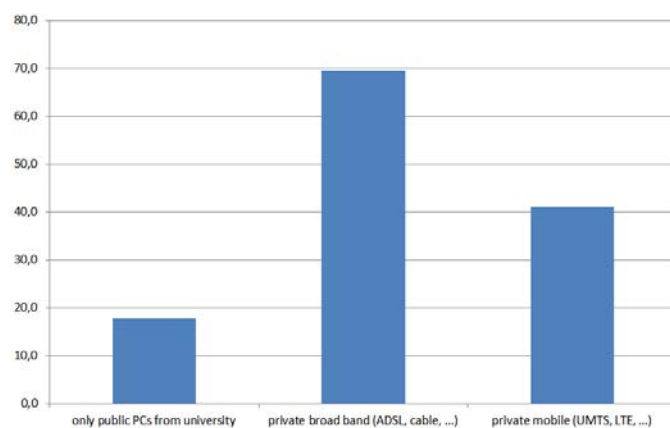Fig. 1. Which devices do you use? (in %, multiple answers possible)

Fig. 2. Which Internet access do you use for studying? (in %, multiple answers possible)

From Fig. 1 it can be seen that more than 93% of the students own a laptop or a MacBook. Also about 93% own a smart phone (either iPhone, Android or others). Approximately 27% own an iPad or another tablet PC, which brings the coverage rate of mobile devices close to 100%. In comparison to last year especially the iPads and other tablet PCs increased significantly, respectively by 14%!

As given in Fig. 2 for Internet access about 70% use a broad band access from home and 41% mobile access, which underlines the usage of mobile devices. Surprisingly still 17.8% use the public PCs from our University for Internet access. The Internet access numbers remained nearly the same in comparison to the 2013 survey.

The next - in the context of this paper - interesting questions concern the usage of social media tools in terms of frequency and purpose. Below the results for the by our students mostly used social media tools – Facebook, YouTube and Wikipedia – are given.
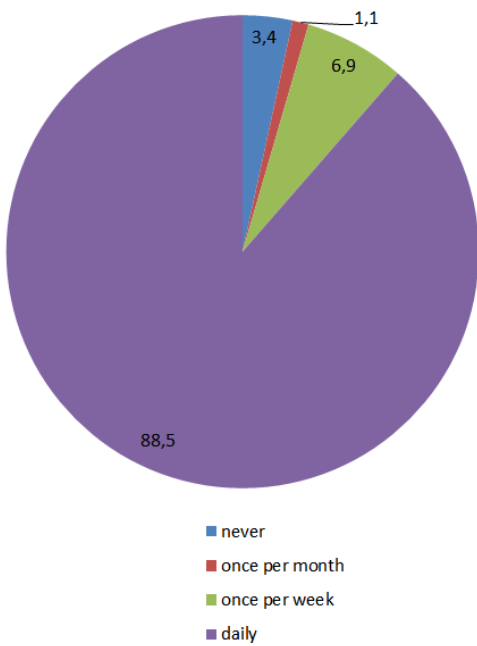

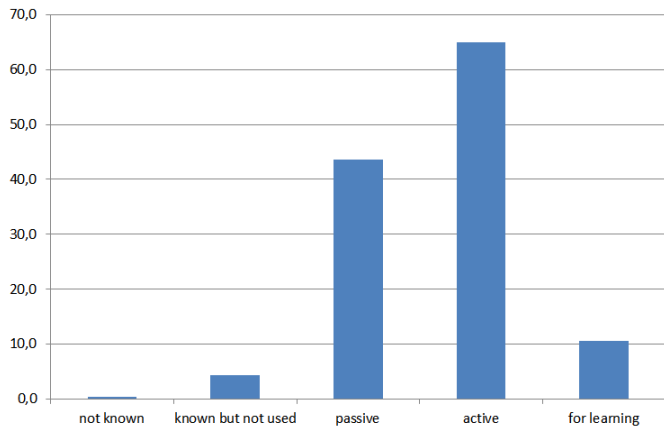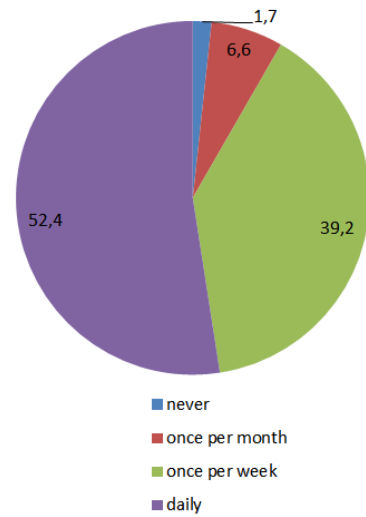Fig. 5.   How often do you use YouTube? (in %, single answer possible)

Fig. 6.   How do you use YouTube? (in %, multiple answers possible)

Fig. 3.   How often do you use facebook? (in %, single answer possible)
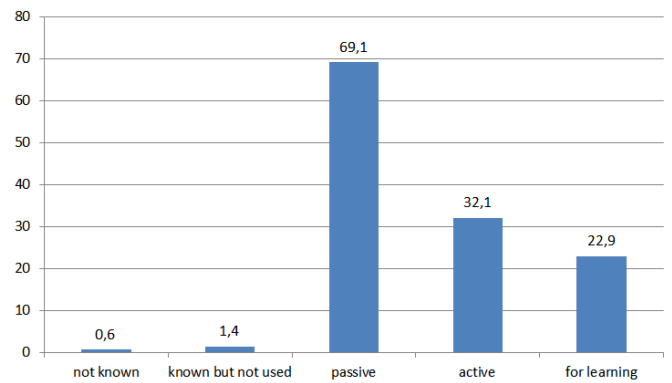

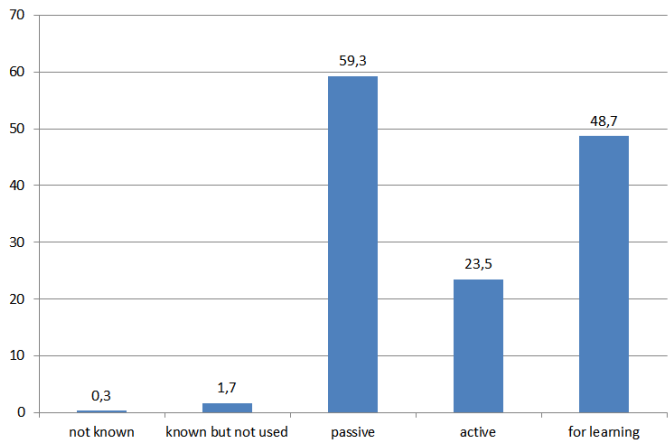Fig. 4.   How do you use Facebook? (in %, multiple answers possible)

Fig. 7.   How do you use Wikipedia? (in %, multiple answers posssible)

From figures Fig. 3, Fig. 4, Fig. 5, Fig. 6 and Fig. 7 it can be seen the by far mostly used social media tool is Facebook, which is used by 89% of our students daily. Nearly 11% use this tool also for learning. YouTube is used only by 52% daily and nearly 23% use it for learning, which is twice as much as for Facebook. Mostly Wikipedia is used for learning at our university. Approximately 49% of the students use this tool for

learning, 60% use it in general for information consumption. And 24% use it even actively, meaning they also provide content by themselves.

Other social media tools such as Google+ and twitter are only marginally used by our students. E.g. 91% never use twitter despite 82% know it, and 73% never use Google+ (71% know it). Also 93% do not even know MOOCs (massive open online courses).

The second survey we regularly perform is on learning methods students use for studying. In this survey we queried all students of human medicine in an online survey. 2519 students participated, 499 returned an answer, which results in a return rate of 19.81%. 50.8% were female, 49.2% were male. The main part of the participants was in the age between 19 and 25. Students from all semesters participated nearly equally, from the second semester the most answers were received (this is probably because we have a mandatory evaluation participation for the new students since 2014). From this survey the following two questions are of interest in connection with this paper: how often electronic learning media are used and which specific media are used.
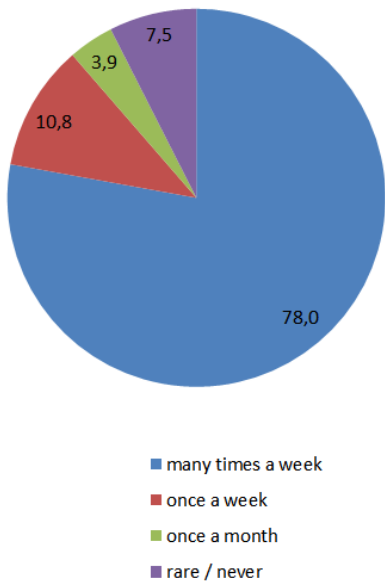

Fig. 8. How often do you use electronic learning media? (in %, single answer possible)
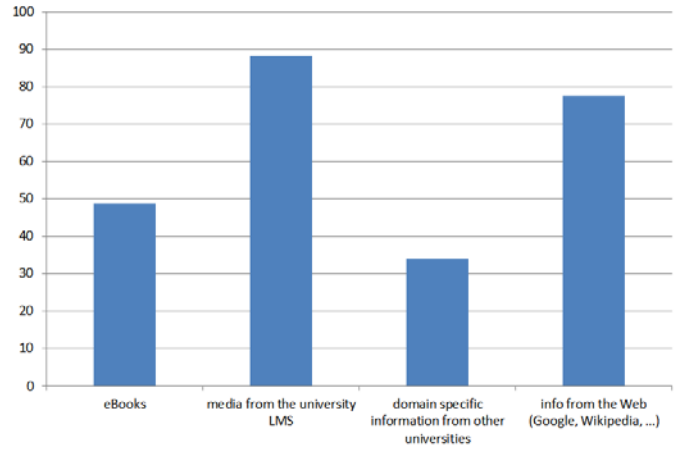

Fig. 9. Which electronic media do you use? (in %, multiple answers possible)

From the results in Fig. 8, Fig. 9 it can be clearly derived that nearly 90% of our students use electronic learning media either many times a week (~79%) or at least once a week (~11%). In comparison to 2014 11% more students access the electronic learning many times a week which demonstrates the technological affinity of our students.

The majority of our students (90%) uses content from our own learning management system, but nearly 80% also use next to our own content also material from the Web.

The last question we want to present here is how our students mostly prefer to learn theoretical material.

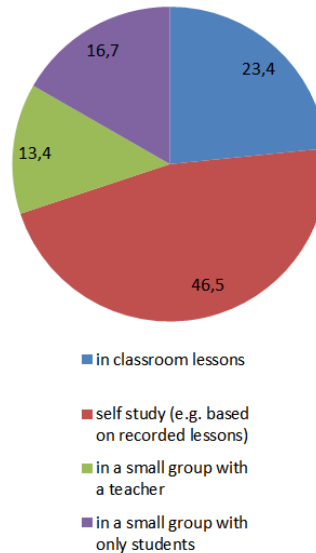Fig. 10. Theoretical material I prefer to learn … (in %, single answer)

From the results in Fig. 10 it can be seen that nearly half of our students prefer to study theory based material on their own by using electronic learning media such as recorded lessons. Only 23% still prefer the classical frontal classroom lessons in large groups. This is a clear signal to change classical teaching methods.

IV. Learning Formats for integrating Social Media Tools

From these surveys we derive that social media tools including Facebook, YouTube, file sharing and Wikipedia are not only used for private issues at our university but also actively for learning purposes. Furthermore we know from the survey that practically all students do own a laptop and/or a smart phone with WLAN being able to connect to the Internet any time. At our university WLAN is provided for free for students with access nearly on the entire campus. So it is a matter of fact that mobile devices are also used during classroom lessons.

We were also interested in what students are doing with their laptops during classroom lessons. So we observed them from behind during a normal lesson. Not surprisingly they are online but usually they do something which is out of the context of the lesson currently taught. Knowing this fact we wondered, how some of these social media tools could be actively integrated into classroom teaching. We came up with three learning formats which are described in more detail in the following chapters.

A. Learning Format 1: Large Frontal Lectures with Usage of Online Voting

Especially for lectures with a large group of students interactivity between teacher and students is very limited. In order to overcome this limitation we suggest the usage of live voting in the classroom. In this learning format the teacher sets up his lesson in (short) theory and question blocks. After each theory block questions for the students with multiple answer possibilities are raised. The students can give their answer by voting. This can be either done by dedicated hardware devices or by the usage of their mobile devices and/or laptops in connection with special free available social tools on the web.

Alternatively also domain specific tasks as proposed by [6] can be used. Domain specific tasks have the clear advantage of being closely interconnected with the learning material and hence make it more attractive for students to participate (fun factor). This could e.g. be a short game or simulation in order to demonstrate certain facts. On the other hand these domain specific tasks have to be individually designed, which generates more effort for the teacher and also requires certain tools. In PhD thesis at the University of Siegen a tool for creating flexible online queries is ´currently developed [7].

A tool we can emphasize for creating simply multiple choice questions was developed by a team at the Graz University of Technology and is called "feedbakr" [9]. The tool is available for free, and even though a commercial version is currently being developed a basic version of this tool will always be free available according a message from the developing team. Feedbackr allows teachers to create simple single or multiple choice queries (see Fig. 11 below) which can then be made available via web links (so called sessions) to the students. Students access sessions by the published web link and give their anonymous feedback. The feedback is collected on the server and can then be visualized for all by the teacher.
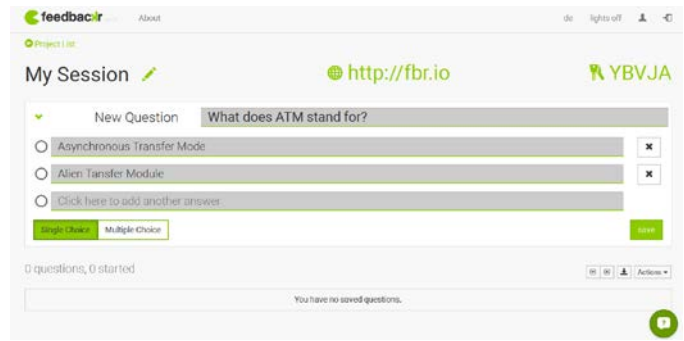

Fig. 11. Feedbackr user interface for creating questions

At our university we are using a hardware based solution from Option Technologies "OptionFinder G2" with voting devices and a power point plugin [8]. Basically the set consists of a suitcase with the voting devices, a receiver which can be connected to a laptop or PC and appropriate software in order to publish the results live e.g. within MS PowerPoint slides. It works as follows: the teacher integrates queries directly into his slide presentation, announces the start of voting, and results are directly visualized within a PowerPoint slide.

The clear advantages for this format are:

- all students can participate, which is usually not possible only using oral feedback in large groups. The hardware solution has the advantages that the participation of students is not dependent on the capabilities of their own devices.

- the feedback is anonymous. This encourages according to our experience more students to participate because the fear of blaming him- or herself in a large group or in front of the teacher is gone.

- the teacher can dynamically adapt the presented content according to the answers given. E.g. when many wrong answers given content can be further elaborated, vice versa when there are many correct answers content may be compressed and more sophisticated material may be presented.

- these devices can also be used for efficient examinations in larger groups. This is done by clearing the anonymous mode and giving each student a dedicated and identified device. Now the answers can be uniquely related to persons and teachers can give evaluate the answers and give marks.

On the other hand the hardware solution costs money in comparison to free software tools, which has to be calculated before using in very large groups (each student must have a device). With pure software solutions accessible by mobile devices and laptops also large groups can be quite inexpensively queried by taking advantage of devices already owned by students. An important selection criteria for a software tool is on how many different devices it can be used, since students usually do own a vast variety of different mobile devices. If you decide to go for apps at least iOS (Apple) and

Android has to be supported. A good choice are web based tools without the need of special plugins (such as feedbakr we introduced before) since nearly all devices including smart phones and tablets provide a web browser. Tools not based on dedicated hardware cannot be used for examination due to the fact that no easy identification is possible, and also cheating cannot be prevented (each mobile device has usually an Internet connection which can be extensively used for cheating).

In any case we strongly recommend to perform regular surveys as we do it on our university in order get a good picture of what devices are currently in use by the majority of students. We also recommend to test the voting learning format in a field trial before integrating it in your standard teaching process in order to grant on the one hand the majority of students can actively participate in the lesson and on the other hand that you feel comfortable and firm with this new format.

B. Learning Format 2: Classroom Lecture in Combination with a live Feedback Channel

This format can also be used for lessons with larger groups of students. For this setting two beamers and two computers are needed. Next to the slide presentation of the teacher also a live feedback channel is projected (e.g. on the side wall of the lecture hall), which was opened for this lesson and where all interested students can participate. As a live feedback channel the free available social media tool twitter [10] may be used. For this purpose the teacher and each student must have an account at twitter. The teacher then creates simply a tweet with a unique hashtag – e.g. #mylesson_ICL2015 as given in Fig. 12.
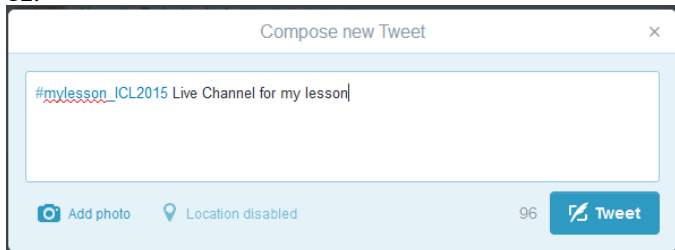

Fig. 12. creating a tweet with a unique hashtag on twitter for live feedback

The hashtag has to be announced to the students at the beginning of the lesson. They have to use this tag just in front of every message they post. The teacher now uses the search function and searches for entries with this hashtag. Under the rubric "live" you can visualize all tweets which used the hashtag, as visualized in Fig. 13.
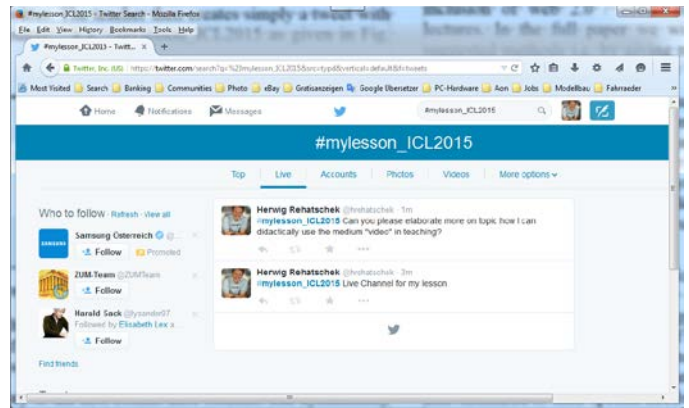

Fig. 13. live visualization of all tweets belonging to the hashtag #mylesson_ICL2015

This results in a live text feedback channel for the lesson. Now the teacher has to look from time to time what's going on there and to react, e.g. answer questions or adapt the content.

In contrary to the first format here students can dynamically comment on the content presented by the teacher. They may raise questions, criticism or suggest wishes for deeper elaboration of certain parts. This results in active participation of many students and grants a dynamic development of the lesson according to the needs of the students.

The clear advantages of this format are:

- dynamic development of lessons according to the needs of students. This makes lessons for students very interesting and attractive.

- teachers can efficiently interact with students in large groups and get a good feedback how well the content taught is understood. They may also rise questions and collect the answers via the live channel, hence mix it with format 1.

- students remain anonymous which clearly raises the motivation to put questions in large groups as mentioned before (students are usually afraid of blaming themselves)

From the point of technical resources this format is a little bit more sophisticated since you need two computers and beamers and also a possibility for double projection. This could be a simple laptop projecting on a second screen (which some huge lecture rooms offer) or simply the side wall of the lecture room. In case you decide to use the free tool twitter students must create an account, which could be of course also a dummy account only used for this lesson. In this case - since you have to register by providing a valid E-mail address - we recommend in this case to use only a temporary E-mail such as provided by 10minutemail [11]. This service provides you with a temporary E-mail address where you can receive for 10 minutes mails, which is enough to confirm your twitter account.

C. Learning Format 3: Usage of Social Tools for Group Works

The third learning format we suggest is mainly meant for home work in groups or can be used also with a flipped classroom concept. In this format students get from the teacher a task to solve which has to be done in a group. For this purpose social tools such as (closed) Facebook or Google+ groups can be used for the exchange of opinions and discussion amongst the group members.

A wiki tool – such as it is offered in nearly all modern learning management systems e.g. in the open source product Moodle - can be used for the collaborative development of the work result to be presented afterwards to the other groups and the teacher. For this purpose the teacher has to create a task which can be divided into pieces which – when put together – make up the solution of the problem.

For example the task could be the technical description of the main components of a personal computer. In this case each group will get a part, i.e. the CPU, the RAMs, the graphic card, the mother board, the HDD and so on. Now the teacher has to prepare a basic structure in the wiki by creating simple headings. Each group is responsible now for one chapter which can be filled with content. This can be simple text but also extended material such as videos and animations, depending on the creativity of the students. Finally it ends up with a complete wiki "the technical components of a personal computer", which can then be presented by the students in a frontal lesson to each other and further discussed. The teacher may personally give feedback and/or may let the other groups comment.

Clear advantages of such a format are:

- easy possibility to network amongst the other groups. Since the wiki is an online tool all groups always see the work of the others and may mutually benefit from this.

- work is automatically documented and may be published or serve as an example for later groups.

- group work fosters social interaction which motivates students to learn and also makes fun.

Technically the teacher and the students have to make themselves familiar with the basics of a wiki tool hence to learn wiki markup language. This is an easy to learn mark up language, however, there exist also wiki tools with WYSIWYG editors where you can write just as in a simple text editor.

V. COMPARISON AND DISCUSSION OF RESULTS

Format 1 (usage of online voting) and format 2 (lecture in combination with a live feedback channel) result in clearly more active participation possibilities of students in lessons with large groups as it can be done by just using oral feedback. In both formats the feedback is anonymous, which encourages according to our experience more students to participate because the fear of blaming him- or herself in front of the teacher and/or the group is gone.

Format 3 (usage of social tools for group works) offers the advantages of social media tools including automatic documentation of all activities for all group members (all postings are saved) and provides additionally the possibility to perform a group work also with members which are not physically present at the time. Last but not least group work fosters social interaction which motivates students to learn and also makes fun.

VI. SUMMARY AND CONCLUSIONS

We suggested three concrete learning formats for the active inclusion of web 2.0 / social media tools and mobile devices into classroom lectures.

Format 1 is already used at our University. We received very good evaluation results from lessons where this format was used. Students are highly motivated to actively participate, furthermore it is a highly welcome diversion to the classic lessons. This format can be further used for examinations, which is another advantage of this very flexible format. In this case the students are of course not anymore anonymous. Format 2 and 3 are ideas derived from surveys on students which we want to share with the teaching community in order exchange know how and to receive feedback.

Obviously especially in the formats 1 and 2 the teacher must be very firm in his or her subject and must have the ability to react spontaneously on questions and must be able to dynamically adopt the content of the lesson. This can be of course a challenge. On the other hand it makes the lesson for students much more attractive due to the fact that it is in some aspects individualized to their special needs and the content delivered dynamically changes with the knowledge level of the students.

As a final statement we can say that the challenge is not in developing innovative new technologies but to develop a new culture for learning!

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