REACHING NET-GENERATION LEARNERS WITH SOCIAL TECHNOLOGIES FOR LEARNING

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Abstract

We will show that using innovative collaborative technologies (such as wikis, instant messaging or peer-assessment) in a physics project can motivate our "millennial" generation students. We have implemented these technologies in a multicampus educational setting (geographically dispersed) with a large student body (more than 600 students), involving two engineering disciplines.

Keywords: e-learning, social software, millenials, net-generation, information skills

The millennium generation student in our classroom

"*Today's students are no longer the people our educational system was designed to teach*," Marc Prensky already wrote in 2001 [1]. They are constantly online, make new friends on the internet (which they cannot imagine ever living without), are using information and communication technologies for their hobbies, going on holidays, communicating with their (grand)parents and friends… [2] Sometimes we even think we see a totally "*different kind of logic at work*", according to Jason Frand [3] : they multitask, *do* instead of *know*, *type* instead of *write*, *game* instead of *study*. Connectivity and communication are essential in their lives.

> "*Come on, dad, be reasonable! That's like me asking you to **get rid of mom** for a week!*" said a 16 year old boy to his father after hearing that his cell phone would be confiscated for a week as punishment.

These changes in their use of technologies go hand in hand with changes in their cultural experiences. They move from a 'read only' reading culture to a 'read-write' participatory (and online) culture. This new culture focuses on creation of new content and remixing existing media (audio, video...), and is clearly demonstrated by the success of websites such as Youtube or Wikipedia. The influential Time Magazine gave the "Man of the Year" award in 2006 to "You", i.e. users participating in an online environment and thereby creating added value. Time gave this award because of the massive paradigm shift this represents in the way we work, learn, travel or participate.

Some educators claim these net-generation learners we face (also referred to as "*millenials*") indeed have fundamentally different attitudes, skills, expectations or even mental processes as opposed to the young students we *used to* teach in our educational institutions [4]. How do we *educate the net generation* [5]?
Other educators claim the current generation is not so 'radically different' : complaining about students is something we have been doing for hundreds (even thousands) of years. *Students are from Mars, Teachers are from Venus,* as one instructor wrote [6].

"The times they are a-changin'"
While our millennial generation student population is constantly and actively online, they still face classrooms which are only slowly beginning to move towards more active and participatory cultures. Our teachers are slow to adopt new technologies - most educators 'teach as they have been taught' or do 'old things in new ways' [7], which results in the fact that internet is not really used extensively in our schools [8]. When we do use technologies for education, our use is often limited to conventional learning management systems which reflect a rather traditional view on education, which is very teacher centred and focused on delivery of content rather than stimulating interaction and communication. When we do in fact think that learning should be social and active, why is it our conventional e-learning environments only barely reflect this?

Whatever view an educator has on technology and its role in our society, he/she must admit we live in a rapidly changing world which we have to prepare our students for. They will require adapted skills, with much more focus on collaboration, technologies for worldwide networking, and an innovative entrepreneurial attitude. Using powerful collaborative technologies in their educational setting is therefore a condition sine qua non. Ideally, we should also complement our regular educational setting with interdisciplinary work, because our engineering students obviously face professional (work) settings in which multidisciplinary teams are ubiquitous.

> Every morning in Africa a gazelle wakes up. It knows it must run faster than the fastest lion or it will be killed. Every morning in Africa a lion wakes up. It knows it must run faster than the slowest gazelle or it will starve…
>
> It doesn't matter whether you are a gazelle or a lion, when the sun comes up you had better start running.
>
> African proverb, quoted by Milton friedman [9]

Social technologies for learning?
As previously mentioned, the new participatory culture is translated online by a whole new array of websites and tools, focusing on sharing, communicating, and reusing. This 'new' kind of internet is also referred to as "Web 2.0", a term coined by Tim O'Reilly [10]. The Web 2.0 - or 'social internet' – focuses on social interactions between users, who are seen as active producers of content and not merely as consumers. The social internet consists of tools such as weblogs, a place where people may write online diaries (e.g. www.blogger.com), wikis, tools for collaborative writing of texts (e.g. the world-famous www.wikipedia.org) or social network sites (e.g. www.linkedin.com or www.facebook.com).

More and more educational experts think the social software tools may be of great use to enhance and enrich our teaching practices, precisely because these software tools put much more focus on the consumer (student) as an active participant in the learning process, and much more focus on communication and interaction [11]. Moving our conventional e-learning environments towards more active environments for learning, is also referred to as "e-learning 2.0" [12].

In the remainder of this article, we describe our implementation of innovative technology-based educational setting in which we take these insights into account. First of all, our setting will enable multidisciplinary work between campuses which are geographically dispersed. Secondly, we will use innovative collaborative technologies which will teach the students how to use these instruments to work together. We will show that this educational setting provides an inspiring learning environment for the students, in which they show not only a positive learning attitude but also demonstrate that they have (or can obtain) the skills to solve a scientific problem by working with collaborative writing and communication technologies.

Setting the scene…

The educational experiment takes place in two first-year engineering curricula (industrial sciences and engineering sciences), and involves a very large student body (more than 600 students). The project involves "polarization of light waves", and starts with the students having to study an online module with pre- and post-tests to test prior knowledge and insight in the topic. After the self-study module, the students form small groups (4 students per group), in which they write a scientific paper about a physics problem involving polarized light waves. This is a collaborative writing process, where all the work happens in an online format (using, for instance, discussion boards, chat sessions, wikis...). This article focuses on the online interactions between the learners, and how they succeed (or fail) to submit a collaboratively written scientific paper.

We have already used this setting for three consecutive years, and have adapted the format slightly each year in order to fine-tune the experiment. In previous publications, we have documented the educational context, focusing on multidisciplinary work [13], collaborative writing using wiki technology and peer-assessment processes [14-17]. This reflected our adaptations in the format, which consisted (among other things) of rethinking the assessment methodologies, coaching workload, and collaborative writing instrument. Our main findings were that the students appreciate the innovative learning methods and interdisciplinary work, and succeed in collaboratively writing a solution to a complex problem. Furthermore, the peer evaluation process is a fair way to grade students, but needs to be refined: the students want more and better feedback both from their peers and from their tutors.

In the remainder of this paper, we will focus on the communication aspects of the project, and how we feel our changes in communication tools reflected a more open approach to the students' learning. We will also stress the need for better information skills for our student population and how projects such as these may contribute to this. In previous articles, we have focused on the quantitative aspects of our project evaluation. This article will be of a more qualitative and descriptive nature.

A wide variety of communication tools

Strangely enough, just as most teachers are online and have email addresses with which to

communicate, our student population is turning away from this e-communication tool. Statistical data reveals that each year the group of youngster that actively use e-mail as their primary communication tool gets smaller and smaller. The students find e-mail a communication tool to converse with their teachers, but not to use for discussing among their peers – for this they have instant messaging tools (such as MSN) or short messaging services (SMS). In other words, they may prefer synchronous communication tools (such as phone, chat, SMS...) to asynchronous communication tools (such as e-mail). This may be attributed to the fact that they have a "constantly connected" attitude, where they are used to instant feedback and seek a rich social environment [18].

We see the same attitude when our learners face the learning management system of our institute. Discussion boards are not the preferred communication tool of our student population, even though educators see a lot of advantages in this tool (such as having a detailed logbook of who wrote what and when). It is our impression that more and more students only use discussion boards when it is mandatory for the course they are following. For asking questions about learning content they use their own preferred communication instruments. In the following section, we will describe how we used these insight to modify our project setting, and how the students responded to our modifications.

Initially, we used an asynchronous communication tool (a simple discussion board) to enable collaborative work between the students. This was not evaluated very positively by the students, who are used to much more flexible solutions (focused more on synchronous communication) and found the discussion board cumbersome to use and confusing to collaborate. In our last project runs, we no longer obliged the collaborative discussions in the forum. Instead, the students may use their own preferred communication tools, such as instant messaging clients, telephone conversations, videoconferences or e-mail conversations. While this diversity in communication instruments obviously complicates the assessment and coaching processes, we have found that the students clearly appreciated the increase in flexibility and freedom. We also observed that the students used a wide variety (mix) of communication tools, adapted to their needs and contexts. Table 1 shows an overview of the communication instruments our students used for the collaboration (additional to the use of the wiki, which is used by all the students to write the paper and keep track of their learning progress).

Table 1. Overview of the communication tools our students used for their collaborative work (on top of the wiki).

	Amount of students
Instant messaging + mail	*127*
mail	*124*
Instant messaging	*91*
Cell phone + Instant messaging + mail	*28*
Cell phone + mail	*5*
Cell phone + Instant messaging	*5*
Other	*23*

We see from this table that e-mail is still quite popular for their (formal) study work, contrary to our initial belief that they would prefer more synchronous tools. 70% of our students use mail as part of their communication tools, and 31% uses *only* mail for their communication. Instant messaging is very popular, as we had anticipated, and is being used by 62% of our students for their collaborative work (22% used *only* instant messaging). We clearly see that students use a wide variety of tools, according to their own needs and contexts. Initially, we were surprised at the high percentage of students still using e-mail as their primary communication tool, contrary to our initial hypothesis that they would prefer synchronous tools. We attribute this to the fact that most students might find it awkward to chat with other students they do not know. E-mail may provide an informal first contact method.

The advantage of letting the students decide on the best tool to discuss is obvious. They will choose the instrument which suits their context best – *one size will never fit all*. There are however also clear disadvantages to this method, both for the students and for the evaluators.

The need for improved information skills

The main disadvantage for the students is a very fundamental one. By having multiple communication moments and instruments, where it is obvious that not always every team member will participate in every discussion, it becomes exponentially more difficult to make good arrangements. There is no (formal) trail of the communication moments, team members who want to check up on the deadlines or discussed problems will have a hard time finding the exact information. This is a problem which the students will also face in their professional life, where all communication happens through multiple channels and clear instructions are essential.

There is also a disadvantage of this more informal communication method for the allocation of the grades to the students. The students grade each other by means of a peer-evaluation instrument. It is our belief that only the students (and not the professors) can give a fair judgment of who precisely did what (and to what effect). When students complain about the grade they received from their peers, however, it is virtually impossible to trace all the communication moments between the group members, precisely because of the diverse array of instruments used. We are therefore dependent on the goodwill and fairness of the students involved.

While the students themselves claim that they have a very fair and unbiased view for allocating the peer-factors [17], we do see reasons to believe that their allocated peer grades might not be as carefully considered as we would want. In principle, the students have all the information they need to allocate a fair grade to their peers. We make available a detailed list of the competences that are to be evaluated, and the students may use the logbook to investigate who did what. In this logbook, all students detail what they have done for their group. Wiki software, however, additionally has the interesting capability to 'track changes', i.e. to see which user precisely did what changes at what time. This is obviously a very powerful tool for the students to get a good view on what their peers' involvement was in the project. However, when asked whether or not they used this tool, the majority of the students (69%) admitted rarely or never using the 'track changes' feature (detailed in Table 2). In future runs of this project, it is clear that we will have to focus more on the criteria (quantitative and qualitative) that the students use for their peer evaluation.

Table 2. How often did the students use the 'track changes' feature of the wiki?

	Amount of students
never	*240*
rarely	*82*
sometimes	*94*
frequently	*36*
very frequently	*14*

Conclusions

In this paper, we have described how the use of diverse and innovative communication tools has improved our educational setting in which small groups of students have to write a scientific paper using web technologies. The students clearly value the possibility of using a wide variety of tools, and use mail, instant messaging, and other forms of communication. In order to give a fair grade to all the participating students, we use a system of peer-grading, in which every student grades his or her team members. The students appreciate this assessment method, and feel they are able to give a fair and unbiased grade. However, we do see possible problems with the wide variety of communication instruments in this respect: the students may not be fully aware of the exact participation of each team member because of the lack of formal communication structures. We also confirmed that they barely used the technological possibilities of our wiki environment in order to track the changes their peers made.

We conclude that it is possible to reach out to the millennium generation that is currently in our universities by letting them have some control over the instruments they use for their learning while keeping a strong focus on the institutional aspects (i.e. students have to be formally graded). Using informal communication instruments is part of their life and culture, and does not seem to complicate much the assessed and formal structure of a conventional group work. We do need to keep a careful balance, however, between informal communication tools and formal assessment methods which need to be transparent both for the students and for the involved professors.

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Biographical Information

Dr. Maarten Cannaerts works since 2001 in the field of e-learning and technologies for education at the De Nayer institute in Flanders. He is responsible for educational innovation and teacher support, and is primarily interested in social software technologies for the millennium generation students, regularly giving lectures for a wide variety of audiences (higher education, vocational training, teacher training programmes...). He participates in a number of research and innovation projects and plays a major role in the successful Flemish online teacher training course "ELISE-learning" (which originated from the Socrates project 'E-learning for in-service teacher training in Europe'). He also works part time for the British Open University as an associate lecturer for the course "implementing open, online and distance learning. Finally, he works for the Flemish Department of Education as a policy advisor in the field of e-learning and distance learning for lifelong learning.

Dr. Greet Langie is member of the Executive Board of the Department Industrial Sciences at campus De Nayer and responsible for the educational policy of the institute. Her primary interests are educational innovation, e-learning, teacher training and assessment. In the context of the physics courses she teaches, she does research on assessment techniques in laboratory environments and the effects of flexible learning on practical training. Finally, she is a member of the SEFI working group 'Physics and Engineering Education'.

Dr. Walter Lauriks works as a research fellow at the Laboratory of Acoustics and Thermal Physics of the Department of Physics of the University of Leuven (K.U.Leuven), his main research area being sound propagation in elastic porous materials. He is full professor and director of the Laboratory of Acoustics and Thermal Physics of the K.U.Leuven, and main author or co-author of more than 100 publications in international peer-reviewed journals and more than 110 conference proceedings for international conferences. He also contributed to 7 book chapters. Since 1997, Walter Lauriks is Associate Editor Physical Acoustics "Acustica united with Acta Acustica". He is member of several scientific organizations, such as Acoustical Society of America, Association Belge des Acousticiens (board member), Nederlands Akoestisch Genootschap (Dutch Acoustical Society NAG, board member), IEEE, and The American Association of Physics Teachers.

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