IMPLEMENTING ACTIVE LEARNING
A challenge to teachers and students in higher education

Elisabeth Saalman
Chalmers University of Technology

saalman@chalmers.se

Abstract

Higher education is in a process of changing conditions. Many of these changes concerns teaching and learning and the challenges both teachers and students need to be able to meet in the near future. This paper deals with teacher role and actions needed to meet the students´ needs and desires in order to create effective learning environments and course design supporting active learning among the students. There is a need to share teaching and learning experiences, to have a continuing dialogue and to work in the direction of offering students active learning possibilities and good learning, both face-to-face and in virtual learning environments. Using flexible learning, digital media and computer-mediated communication are, among other parameters, identified as important ingredients in creating active learning environments to students.

Workshop topics

Human scale engineering, Autonomous learning, Beyond active learning, The role of emotions in learning

I   INTRODUCTION

Higher education is in a process of transition and changing conditions. Many of these changes concerns teaching and learning and the challenges teachers and students will meet in the near future. Today there is a conception of the active, critical and independent student controlling her/his learning. There is a need for professionals who are well qualified for supporting learning in the new era with changing roles and role boundaries in a shifting balance from teaching to learning in higher education [5]. There is a need for open-minded, straightforward dialogue concerning higher education and how to create, implement and support active learning among students.

There are initiatives dealing with teaching and learning in this new education era. One such workshop initiative is the Active Learning in Engineering Education (ALE). This paper will discuss teaching and learning in view of the last ALE workshop; 9th Workshop on Active Learning in Engineering Education – ALE 2009, http://ale2009.ac.upc.edu held in Barcelona 9-12 June 2009.

II   TEACHING AND LEARNING ISSUES

At the 9th Workshop on Active Learning in Engineering Education – ALE 2009 there were several themes focused, among others themes sorted under the headings Autonomous learning, Beyond active learning and The role of emotions in learning. Several contributions were presented at the workshop concerning active learning and autonomous learning. Some of them were:

- Building student engagement in active learning (Dolors Sala, Eduard Bonada, Universitat Pompeu Fabra, Spain)
- Attempting to make active learning real: a case study of curriculum reform (Mark Sommerville, Jonathan Stolk, Olin College, USA)
- Active learning in learning communities. Towards an autonomous and shared learning (Angel Alonso Gutierrez, Natalia Margarita Parada, Universidad de los Andes, Colombia)
- Promoting students´ intellectual autonomy and authorship (Juana M Sancho, Fernando Hernández, Silvina Casablancas, Sandra Martinez, Universitat de Barcelona, Spain)
- Museums of Active learning environments (David Rincon, Natalia Margarita Parada, Universidad de los Andes, Colombia)

It seems clear that motivation is necessary to get high quality in students´ learning. The students´ attitude and engagement is crucial in the learning process and the students themselves should have a central role in the process. A true challenge in active learning is to catch the student motivation and engagement in order to be active in the learning process. If you should be able to learn in an efficient way, resulting in new and long-term, sustainable knowledge, the learning resources and learning environment need to trigger curiosity, real interest, happiness, motivation and also offer good coaching and feed-back in the learning process. It is a great challenge to get students truly interested. Several contributions at the ALE workshops 2009 dealt with emotions in learning, engagement, the importance of personal goals and motivation and willing to participate in a learning community. Two examples at the workshop were:

- Experiences on emotion-based techniques aimed at enhancing the performance of the learning process (Carles Gomez, Universitat Politècnica de Catalunya, Spain)
- Transformative learning – in action (Michael Christie, Chalmers university of technology, Sweden)

The last paper introduce the concept of transformative learning and changing identities. It high-lights the importance of values and the emotions surrounding them and the role they play in teaching and learning in a team. It is of great importance to try to set an open, positive, trusty, creative atmosphere among the students that make them engaged and willing to participate. Contributions about group/team work and group assessment were also present at the workshops:

- Improving teamwork abilities across cultural differences (Mirjam Godskesen, DTU Management, Denmark)
- How does one assess work that has been performed by a group and how does a group prepare for such an assessment? (Elie Migrom, Benoit Raucent, Caroline Verzat, Universite catholique de Louvain, Belgium)

Dialogue and reflection among students in a "learning community" I believe is of utmost importance. I think the best kind of learning and knowledge-building takes place when you reflect together with other people and uses the knowledge to solve real, authentic problems. If you get good feed-back from co-learners and lecturers I am convinced it can lead you further in an efficient progression of learning.

My opinion is that the student has the responsibility for her/his learning. The lecturer, on the other hand, has the responsibility to coach, to offer good learning resources, to give feedback, encourage the learner and assess in a relevant way relating to the learning objectives. Encouragement is a very important component in learning. In my opinion we use the encouragement "tool" far too little in the learning situation but also generally in our organisations. It is very important, in doing a good job, to feel that someone cares and asks for what you are doing and have expectations on you.

I am also of the opinion that you learn better if you are offered several different learning resources having the potential to engage you in a lot of ways; visual, reading, video, writing, doing, audio, discussing, reflecting etc – and of course making you being active. When you at the same time can practice what you are learning you will remember and learn much better, especially if you have the possibility to learn and reflect together with other people.

When you manage, have reached, the learning outcomes you get self-esteem and happiness and a feeling of belonging. This is crucial for your studies and to manage to take responsibility for your learning – to discover and make good decisions how you learn in the best way.

III   COMPUTER-MEDIATED   TEACHING AND LEARNING

Today there is a conception of the active, critical and independent student controlling her/his learning. There is a need for professionals who are well qualified for supporting learning in the new era. There is a need to activate and promote the use of information and communication technology (ICT) in teaching and learning [5]. The teachers need to be well qualified for supporting learning in virtual environments, in addition to the traditional university setting of face-to-face teaching. Increased pedagogical skills and know-how in the area networked communication and learning materials is needed. Teachers have to facilitate student learning through pedagogical use of modern technique and virtual communication [1,2,4].

Universities need to add IT and virtual communication to the education since these tools are very natural ways of finding answers and to communicate among students at our universities. There are studies showing students of today reading fewer textbooks, use the world wide web more and more in their studies and prefer to be active when they learn together with other people, at real face-to-face meetings or virtual meetings in computer-mediated communication and social communities on the web [3,6,8,9]. Information literacy has become a much more natural concept and tool for students´ of today.

We need to discuss the usefulness and value of new IT and how to use it, in innovative ways, in active learning. How can you support learning in virtual environments in addition to face-to-face teaching in a blended learning setting? How can you create good possibilities and tasks for team-work in virtual environments? How can virtual communication be used in a socializing and effective way to trigger student learning? Increased pedagogical skills and know-how in the area networked communication and learning materials is needed. Teachers have to facilitate student learning through pedagogical use of modern technique and virtual communication. Both the teachers and the students need to be flexible enough and motivated in order to adopt innovative and flexible course design and curriculum. The aim is to create as good virtual learning environments as possible and to design for good and effective learning. Wenger [7] speaks about communities of practice and the importance of mutuality, working together, shared interests, engagement and the way, frequency and quality of communication in a virtual learning environment. Since learning is a collective process it is necessary to offer good possibilities and tasks for team-work also in a virtual learning environment. What are the needs for teachers´ competence development in flexible teaching and learning? What are the student needs and desires in flexible learning?

At the ALE workshop 2009 several papers/posters gave examples and discussed the use and advantages of virtual learning resources. This fact mirrors the change going on regarding university teaching and learning and the use of digital media and computer-mediated learning and communication in higher education. Examples from the ALE workshop 2009:

- Multicultural education, higher education pedagogy, student centred assessment, computer-mediated communication (Christina Poyatos Matas, Griffith university, Australia)
- Calculus, a complete course with interactive materials on Moodle (Joel Saá Seoane, M.Rosa Estela, Universitat de Politècnica de Catalunya, Spain)
- When the physics lecture becomes funny – about the use of "clickers" in the introductory physics courses at DTU (Anne Gregersen, Linda Sendrup, Pernille Rattleff, Learning Lab DTU, Denmark)
- Development and implementation of effective instructional materials for active learning in introductory engineering courses (clicker questions) (Christian H Kautz, Hamburg University of Technology)

- Multimedia material oriented to the new engineering studies in the European Higher Education Area, (Frances Pozo, Nuria, Parés, Yolanda Vidal, Universitat Politècnica de Catalunya, Spain)

- Enriqueta Ferreres, Joan Jorge, Laura Conangla, Joan Ma Mercadé: Making a virtual learning environment for non-assisted Physics laboratory
- Beyond active learning: promoting students´intellectual autonomy and authorship. Among other things pointing out the importance of making the most of digital tools, including digital portfolios. (Juana M Sancho, Fernando Hernandez, Silvia Casablancas, Sandra Martinez Pérez, Universitat de Barcelona, Spain)

IV   REFLECTIONS

The last day of the ALE 2009 workshops ended up with the workshop groups giving suggestions of what questions that need to be high-lighted and further discussed regarding today and future teaching and learning:

How to set the proper environment for active learning?
How can we as teachers create effective learning environments and course design supporting active learning?
How to get people accept another way of teaching and learning?
How can we influence/engage students so they want to learn?
Can we teach how to enhance activating teaching?
How can we change actual teachers/institutions?
How to deal with resistance in the class-room?
How can we develop a syllabus of generic competencies as an integrated part of engineering education?
Etc

There is an obvious need to continue the dialogue about the concept active learning and what it really means to us – teachers and students. After joining the workshop I have an impression that there are sometimes different meanings, interpretations, of the used concepts at the workshop. It may be a good idea to try to find some description/definition – a mutual understanding - that we can look at as the ALE workshop official interpretation of the concepts used.

To judge from this ALE 2009 workshop it is obviously not easy to get all participants to agree on the same concept directly. There seems to be a need for some digestion in advance. In universities we are typically all strong individuals with ideas that we like to put forward and not are so willing to give up without being convinced. However I think this is a strength to universities since we really need strong, reflecting, thinking, engaged individuals that can meet, coach and act as mentors and supervisors to our multi-task students of today. It really should take some time to get together and to accept a mutual view to be able to have a deep, constructive discussion that takes us further.

Another reflection is that I find it a bit stressing to discuss all interesting issues, contributions, during the time-schedule of two and a half day. It is well known that it takes some time to get to know each other and to find each others roles in a group,

and thus to reach discussions of real high quality. I suggest the start of a virtual discussion forum that could help to support discussions within the ALE community. This can help us both prepare and follow-up our workshops by adding the possibility to discuss also in the time between our workshops – to collect ideas, thoughts, reflections, experiences etc from ALE participants.

V   CONCLUSIONS

Active learning has been noticed in a creditable way at the ALE workshops 2009. The ALE community really try to live up to its principles of active learning at the workshops. There is an obvious need to continue the ALE workshops and try to get even closer to the concept active learning and how to realize it to students. There is also a need for a debate focusing computer-mediated teaching and learning, and pedagogical aspects of learning in virtual environments using digital media and virtual communication. The world wide web is a very natural learning resource for students of today and teachers have to take notice of this fact.

Finally, as joining the ALE2009 workshops as an active participant I conclude by giving some thoughts/suggestions of what I think need to be discussed further in our ALE community:

- How to create active learning situations that suits/are appreciated by most people/students?
- How to meet individual ways of learning?
- What have we implemented concerning active learning after this ALE 2009 workshops?
- In order to offer possibilities to discuss, and share our thoughts, concerning the full papers when they are published online, in the Journals and Conferences Repository of the UPC University Library, I suggest that ALE starts a virtual discussion forum for all participants.

REFERENCES

1. Bennett & Lockyer (2004): Becoming an Online Teacher: Adapting to a Changed Environment for Teaching and Learning in Higher Education. *Educational Media International*, v 41 n3 p231-248

2. Collins, Neville & Bielaczyc (2000): The Role of Different Media in Designing Learning Environments. *International Journal of Artificial Intelligence in Education* (2000), 11, 144-162

3. Hemmi, Bayne & Land (2009): The appropriation and repurposing of social technologies in higher education. *Journal of Computer Assisted Learning* 25, 19–30

4. de Jong (2006): Technological Advances in Inquiry Learning. *SCIENCE*, vol 312, p 532-533

5. Saalman, E. (2008) Flexible learning and teaching – a challenge to teachers in higher education, In Proceedings of the eight international workshop ALE2008, Universidad Nacional, Facultad de Ingeniera, Universidad de los Andes, Bogota, Colombia.

6. Tolmie, A., Boyle, J., (2000). Factors influencing the success of computer mediated communication (CMC) environments in university teaching: a review and a case study. *Computers and education, 34*, 119

7. Wenger, E. (1999). *Communities of practice. Learning, meaning and identity*. Cambridge, Cambridge university press.

8. Video from Kansas state university on YouTube concerning A vision on students today: http://www.youtube.com/watch?v=dGCJ46vyR9o

9. Östlund (2008): Prerequisites for interactive learning in distance education: Perspectives from Swedish students. *Australasian Journal of Educational Technology*, 2008, 24(1), 42-56