Presentation for the 15ᵗʰ E-Learning Day at FH JOANNEUM on Thursday 15.9.2016 in Graz (Austria).

Title of contribution: 3D E-Learning for Collaboration

Speaker: Marco Bettoni

(Slide 1) **Title slide**

As the title of our contribution shows, this presentation will focus on one particular tool, i.e. a 3D platform for e-learning known as QUBE and in terms of the methods, I will explore 'collaboration' in more detail.

When it comes to 'critical analysis', the primary topic of this 15th E-Learning Day, I will look at certain *conceptual weaknesses* which we feel are present in the 'collaboration' method and in terms of the tools, I will be discussing certain *unrecognised strengths* of 3D platforms.

This contribution is the result of a collaboration between my Distance University of Applied Sciences in Brig and a private business school in England, Pentacle, which was founded in 1994 by Prof. Obeng who still manages the school today. Unfortunately he was unable to attend today but sends his apologies.

The idea behind our collaboration was that we would introduce the QUBE e-learning system at my distance university – not just the 3D platform but the whole system, including the didactical methods and concepts internally associated with QUBE.

(Slide 2 – 2:45) **Agenda**

I will start with an introduction which addresses the current status of e-learning from the viewpoint of the aforementioned aspects. Then in parts 2 and 3, I will explore the conceptual weaknesses in the collaboration method, as mentioned previously. Parts 4 and 5 will look into the unrecognised strengths of a 3D system and then part 6 of my talk will end with a summary in the form of a concluding message.

(Slide 3 – 3:09) **Authors**

Eddie and I have a few things in common. We are both engineers of education and have been for many years … Currently we work in the management field - knowledge management in my case and organisational theory in his. When it comes to our contribution today, there are three other key things we have in common: a) that we view technological tools as 'enablers' which make things possible and we consider this enabling to be somewhat more important than the technology itself; b) we are both of the opinion that methods take priority e.g. collaboration methods or problem-solving methods; c) and finally, we think that people dominate over these two things – people are at the heart of it all. This connects us and has led to our collaboration. During this morning's talks, we heard about 'People in the Centre' with Ms Schwarze asking the question *"Is e-learning as an activity compatible with human requirements?"* We think that e-learning should be made compatible!

(Slide 4 – 4:52) **Introduction**

So what is the status of e-learning today? We need greater collaboration and knowledge exchange in the economy. The aim here is to learn to better handle and assert ourselves in the knowledge society. One classic solution which we all know is e-learning via a 2D learning platform (e.g. Moodle) which has long been part of daily practice. Unfortunately, when it comes to collaboration, this solution leads to 'text-based' or rather 'text-heavy' interaction: you need to be able to write well and better still, enjoy writing and not everyone does. Experience has shown that the interaction required for collaboration is lacking. During Prof. Renninger's plenary session this morning, we heard that Moodle is used solely as a storage space for documents.

There is a lack of interaction and the question is why. We think that this solution (2D platforms) does not meet the requirements; we are therefore confronted with the situation that collaboration is not sufficiently supported by 2D e-learning platforms.

So how can we better support collaboration? As mentioned, we would like to address two aspects today: a conceptual clarification of the terms collaboration and collaborative learning and the unrecognised strengths of 3D platforms.

We think that this can facilitate an understanding of the need for collaboration and the needs involved in collaboration.

(Slide 5 – 7:02) **Collaboration: distinction**

One possibility for clarifying the term collaboration is to distinguish it from the term cooperation. The two terms are often used synonymously but practical experience shows that they are not synonyms.

In cooperation, the task is divided into parts and each individual person or group is responsible for one of these parts. The success factors include the competence of the individuals involved to ensure that they deliver a high level of quality. In the image, we can see how the dog takes on the function of stairs – it is responsible for this and has to stand still, stairs should not move. In the meantime, the cat makes use of the resources stored in the fridge – it is responsible for handling technology correctly.

Collaboration is different: the task remains as a single unit and each participant is responsible for the task as a whole. He or she cannot pull out because then the task as a whole will be jeopardised. In the image, we see a string game: if anyone pulls out, the structure as a whole will break.

Since the task here is a single unit, knowledge should also be a unit; thus the participants have to share their knowledge and this sharing of knowledge becomes all the more important. Therefore, all knowledge processes in collaboration are important and play a key role. The aim here is to build up a shared knowledge resource or knowledge structure. Interestingly, in German there is no suitable expression for the English '*to share*' like in '*shared knowledge*': translating it as 'geteiltes Wissen' does not really work. Italian has the suitable expressions '*condividere*', '*condivisione*' and Russian has '*делить*'. There are also other languages with better means of expressing this term. Perhaps this is an indicator of the reason why it is difficult to implement collaboration in the German-speaking domain.

(Slide 6 - 9:52) **Collaborative Learning (CL)**

If we now observe the didactical method in which the term collaboration plays such a key role, i.e. collaborative learning, the following situation is evident. If, in our society, there is a widespread need for greater collaboration to be successful in the knowledge society, it would make sense to engage in more collaborative learning.

However, it is not easy to implement collaborative learning! This morning, when discussing the experience of the universities, Prof. Renninger mentioned in his keynote speech that "*Implementing e-learning is not easy*". Then, to implement collaborative learning within the context of e-learning will also not be easy; but why? I would like to take this opportunity to give a few indications and potential answers to this question.

Firstly because, as we have seen, knowledge processes as part of collaboration are more complex and so it is all the more important to have a workable concept of knowledge and how we process knowledge – both as individuals and groups. I think it is useful to draw on Ernst von Glasersfeld's contributions to knowledge theory. With his term viability, he offered an alternative to the conventional perception of knowledge as 'true knowledge'.

This gives us the opportunity to better understand complex knowledge processes. On this basis, it would be easier for us to clarify the term collaboration whereby we all need to take shared responsibility for the task as a whole and where the emphasis should be on the act of developing a shared knowledge resource. This would enable us to devise and implement better collaborative learning systems where the focus is on the 'active person', where appropriate, knowledge-oriented methods are selected and finally, where we have suitable technical 'enablers' at our disposal.

Another aspect of the tools enabling collaboration is that we need to consider the role of the space in learning, thinking and collaborating.

(Slide 7 – 12:55) **Space & Learning**

Looking at 2D learning platforms, we have seen that there is a lack of interaction. Why is this? It could be that users cannot interact in their usual way, that 2D interaction is not compatible with human requirements and that it is too text-heavy. We can offer an alternative to this text-heavy style: using a 3D learning platform, which enables interaction between people in their usual way. In fact, experience shows that these 3D environments enable more intensive interaction and easier collaboration. But why is this? I was unable to find a convincing answer to this in the research literature. **So why is interaction better on 3D learning platforms and how can we apply this for successful e-learning?**

One answer could be found by considering the role of the space in thinking. Immanuel Kant made some important observations on this point which are still valid today. This can be found in his work The Critique of Pure Reason in which he conceives space as an essential concept a priori, which underlies all external perceptions ("*Anschauungen*" as he calls them). This could be interpreted as saying that space is actually present in every mental content.

We know this from everyday life where we have experienced visual thinking helping us to better understand abstract concepts. Einstein once wrote in a letter that the elements of his thinking are primarily visual and even muscular in some cases. The mirror neurons, which

play an important role in facilitating understanding between people, are interestingly located in the motor cortex. Many other indicators, such as visual metaphors or figurative language, also show how space plays an important role in thinking.

The hypothesis here would be that spatial clues are an important aid in making interaction more successful, collaboration easier and hence also e-learning better suited to human requirements.

(Slide 8 – 16:22) – **The QUBE System**

The QUBE system is an e-learning system in which these insights have been implemented. Collaborative learning is practised as a didactical method in QUBE and QUBE uses special aids (known as PETs) as solution methods as well as a 3D platform with avatars as a tool or 'enabler' of these methods. An avatar can be seen here in the box on the right of the slide. It is a very stylised figure, a so-called '*box figure*' but which has sufficient similarities to allow people to identify with it i.e. to think yes, this avatar is me or these other avatars are my colleagues e.g. here is Nicole with Willi and there sits Victoria.

In terms of methods, QUBE places significant emphasis on problem-solving methods i.e. it is not just the technical platform which is interesting; in particular it is the problem-solving methods available to users to enable successful learning, together with the collaborative methods. Through the platform, the avatars can move through the spaces, meet and communicate with other avatars, interact with flipcharts, complete presentation cards and position, move and order these cards on boards etc.

(Slide 9 – 17:50) – **Conclusion**

Participants work together in a virtual space which looks like this, for example (image): there are various tables where participants can sit in groups of four, areas where everyone can gather in-front of a large projection panel, where people can meet up in twos etc. The avatars can do everything what people would do in a real learning environment and much more!
Such spatial clues make online interaction more natural and make e-learning compatible with human requirements: they promote interaction and make collaboration easier. Clarification of the terms collaboration and collaborative learning also helps to highlight just how complex knowledge processes become in a collaborative situation while recognising the important role played by the space in thinking indicates that the space can also help to better support those complex knowledge processes and thereby make collaboration more successful.

Thank you for listening (18:50).

15. E-Learning Day at FH JOANNEUM

3D E-Learning for Collaboration

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Agenda

1. Introduction
2. Collaboration
3. Collaborative Learning
4. Space and Learning
5. QUBE, a 3D System
6. Conclusion

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Authors

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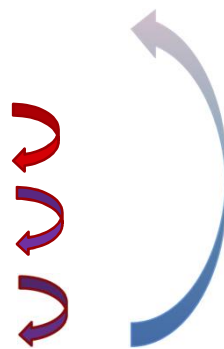More: http://pentaclethevbs.com

Bettoni Marco, Prof., a Member of the Board of Directors at Fernfachhocschule Schweiz (FFHS) since 2005 and Co-director of the Institute for Research in Open-, Distance- and eLearning (IFeL). His main research interests are e-collaboration, knowledge management, online communities of practice, knowledge engineering and knowledge theory. Marco holds an MSc degree in Mechanical Engineering from ETH Zürich. More: www.weknow.ch

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Introduction

- *Need*: collaboration and knowledge sharing
- *Objective*: cope with Knowledge Society
- *Solution*: E-Learning with 2D LMS

- *Consequence*: Mainly text-based interaction

- *Defects*: Absence of interaction

- Causes: Does not satisfy the need

➡ **HOW TO EMPOWER COLLABORATION?**

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Collaboration: distinction

- Concept of **Cooper**ation
  - task is split into pieces
  - each person is **responsible** for one piece
  - Success factors: competent individuals deliver high quality work
- Concept of **Collabor**ation
  - task remains a unit (everyone works on the whole task)
  - each person is **responsible** for the whole
  - each person is mutually engaged in a conscious, continuous effort to construct and maintain an underlying *shared knowledge structure*
  - Learning occurs in the involved knowledge processes
  - Success factors: team spirit, sense of community, group delivers high quality work

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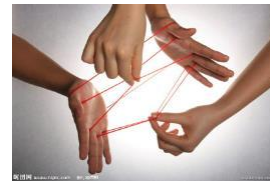
Collaborative Learning (CL)

- Need: more Collaboration
- Objective: be successful in our Knowledge Society
- Solution: more CL
- Challenges of implementing CL
  - How do we know? Notion of Viability (Ernst von Glasersfeld)
  - Better conceptions of CL (foundations)
    - A) shared responsibility for single task
    - B) constructing a shared knowledge structure ("*taken as shared*")
  - Better designs for CL
    - Link learning & doing more tightly. Example: Pentacle didactics (collaborate on real world projects)
    - Role of space : take it seriously also online

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Space & Learning

- 2D Platforms:
  - Interaction is rather absent / users *cannot interact in their usual way*
- 3D Platforms:
  - More intense interaction, easier collaboration
- **WHY?**
  - **Understand this => take advantage from 3D opportunity**
- Role of Space in cognition:
  - "*Space is a necessary a priori mental construct, which underlies all outer perceptions (Anschauungen)*" - Kant 1787, CpR, B38.
  - *Claim*: **Space is present in every thought**
  - *Evidence*: visual thinking, muscular thinking, mirror neurons, method of loci, visual metaphors & figurative language
- Hypothesis: Spatial clues make interaction more intense, collaboration easier

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The QUBE System

- Three elements
  - Learning: user collaborate in space
  - Doing: real world scenarios (cases) & real world methods
  - Technology: avatar 3D environment
- Individual avatar
  - Simple box figure, enough to foster identification
- Real world methods
  - PET: Performance Enhancing Tools
  - How to accomplish a task
- Collaborate in space
  - Meet at a PET panel, groups sit at tables, gather in circle

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