# Developing Authentic e-Learning through Virtual Benchmarking

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**Abstract:** The implementation of authentic learning elements in 12 universities of applied sciences online courses is examined in this paper. The Virtual Benchmarking Project conducted at the Finnish Virtual University of Applied Sciences in 2008 used the elements of authentic learning developed by Herrington and Oliver (2000) as criteria to evaluate authenticity. Fourteen teachers in six benchmarking pairs applied these elements to compare practices and identify development challenges in their online teaching. The study results indicate the elements are implemented evenly in the examined data. Strongly realised elements were authentic context and tasks, while collaborative construction of knowledge, reflection, articulation and authentic assessment were implemented more weakly. Development challenges were identified, such as, increasing working life contacts and peer guidance, and the need for cross-collaboration of learners at various levels of expertise.

## Background to the study

In order to develop the skills required in the workplaces of the future, pedagogic development of higher education increasingly emphasises the need for professional working life orientation and authentic learning (Bonk, Kim & Zeng, 2006; Hunt, 2006; Boulton-Lewis, Pillay & Wilss, 2006). A concurrent objective is expanding online teaching. Establishing a closer interaction between education and work requires reflection on how to strengthen authentic learning elements in online education (Leppisaari, Silander & Vainio, 2006.) Authentic online education refers to learning in environments that provide learners' with opportunities to exercise realistic work practices, methods and cognitive processes in authentic situations, and to make use of authentic sources and materials (Leppisaari, Silander & Vainio, 2006; Herrington & Herrington, 2006).

Teachers require new pedagogic solutions for implementing online teaching in learning environments that utilise a diverse range of digital tools. However, even if they are willing to try these solutions, they do not always feel they receive the necessary support in their own higher education institution (Leppisaari, Vainio & Tenhunen, 2007), an issue raised in an initial survey conducted at the start of this project. There is a clear need to develop continuing education for teachers in which peer development and learning, as well as sharing of experiences, can take place in extended networks. A virtual method of operation facilitates this development.

The research context is the Finnish Online University of Applied Sciences (FOUAS), a virtual cooperative and expert network established by universities of applied sciences (UAS). In 2008, an authentic online education development project (hereafter referred to as the VBM Project) was carried out in the FOUAS, in which a virtual benchmarking approach supported the development of teachers' online pedagogical skills.

## Elements of authentic learning as evaluation criteria

Nine elements of authentic learning proposed by Herrington and Oliver (2000) were applied in authentic learning benchmarking (see also Herrington & Herrington, 2006). They proposed that learning is best facilitated in learning environments that:

1. Provide an authentic context that reflects the way the knowledge will be used in real-life
2. Provide authentic activities and tasks

3. Provide access to expert performances and the modelling of processes
4. Provide multiple roles and perspectives
5. Support the collaborative construction of knowledge
6. Promote reflection
7. Promote articulation
8. Provide coaching and scaffolding
9. Provide for authentic assessment of learning within the tasks

Based on these elements, an evaluation tool was developed for the project, in the form of a table divided into four columns: 1. The first column lists the nine elements of authentic learning, 2. The second column expands on each element by outlining some of its characteristics, 3. The third column suggests a continuum range (values 1-5) for each characteristic (describing non-authentic through to authentic), and 4. The fourth column is a checklist for evaluators. A continuum allows a picture of how much a learning environment adheres to the nine elements of authentic learning to be gained. Lines connecting the points on each continuum can also be drawn. The instrument is shown in part in Figure 1.

**Figure 1:** Elements of authentic learning as evaluation criteria: in part (based on Herrington & Oliver, 2000)

| Element of authentic learning | Guidelines for implementation | Continuum of characteristics<br>Non-authentic → Authentic | Evaluation questions |
|---|---|---|---|
| **Provide authentic context that reflects the way the knowledge will be used in real-life** | • a physical/virtual environment that reflects the way the knowledge will ultimately be used | Decontextualized → Realistic | ❒ Does the context of the course represent the kind of setting where the skill or knowledge is applied? |
| | • a non-linear design to preserve the complexity of the real-life setting | Fixed → Flexible | ❒ Is the pathway students take through the learning environment flexible, where students are able to move around at will? |
| **Provide authentic activities** | • activities that have real-world relevance | Academic → Real world | ❒ Does the task mirror the kind of task performed in real world applications? |
| | • ill-defined complex activities that provide an opportunity for students to define the tasks and sub-tasks required to complete the activity | Multiple small tasks → Complex task | ❒ Is the task presented as a series of small sub-steps or as an overarching complex problem? |
| | • a sustained period of time for investigation | Short time → Long time | ❒ Do students work on the task for weeks rather than minutes or hours? |
| | • the opportunity for the detection of relevant versus. irrelevant information | Limited information → Broad information | ❒ Are students able to choose relevant information from a variety of inputs, including relevant and irrelevant sources? |
| | • tasks that can be integrated across subject areas | Single discipline → Multi-disciplinary | ❒ Are tasks and strategies relevant to other disciplines and broader knowledge? |
| **Provide access to expert performances and the modelling of processes** | • access to expert thinking and modelling processes | Direct instruction → Expert performance | ❒ Does the learning environment provide access to expert skill and opinion? |
| | • access to learners with various levels of expertise | Expertise → Levels of expertise | ❒ Does the learning environment allow access to other learners at various stages of expertise? |
| | • opportunity for the sharing of narratives and stories and access to the social periphery | Didactic, core → Narrative, peripheral | ❒ Are students able to hear and share stories about professional practice? |

## Virtual benchmarking project (VBM): Developing a comparison of authenticity

The objective of the virtual peer learning community (cf. Jackson & Temperley, 2007; Lewis & Allan, 2005) established in the VBM Project was to support teachers in strengthening authenticity in online education. Good practices in teachers' authentic online courses were also disseminated.

Online or web-assisted courses (or parts thereof) offered at UASs were called for. The course being offered for the project was to be examined in the application form according to Herrington and Oliver's (2000) criteria for authentic learning. Twelve UAS courses in entirety (8) or partially (4) became part of the project. The twelve courses are listed and described in Table 1. Thus, six benchmarking pairs were formed. Two cases involved pair teaching, so there were 14 teachers in the project altogether. Any instructor at a UAS could participate in the project as an observer, which meant that in virtual meetings the number of participants varied between 8 and 21 people, the average being 12. Forty-three individuals had logged in to the Ning environment (http://vivabm.ning.com) that was used for the project, demonstrating the networking nature of social media. Acrobat Connect Pro software (ACP) was used as the means of communication in the benchmarking process for virtual meetings, and between meetings, the Ning environment was used as a common information collection and interaction forum.

**Table 1:** Courses involved in the virtual bechmarking project

| | UAS | Course | Description |
|---|---|---|---|
| 1 | Arcada UAS | Physiotherapy for Coronary Heart Disease Patients | Students in pairs plan physiotherapy for each case patient. Anonymous case created together with physiotherapist in the form of authentic test results is available for students in Blackboard. Students communicate with the teacher and working life representative, submit answers and receive feedback using Blackboard. Also teachers and physiotherapists participate in the discussion giving answers and feedback. A classroom seminar is arranged. |
| 2 | South Karelia UAS | A Better Hip – an Easier Life | The course aims to develop functional thinking models in the care and rehabilitation of artificial hip replacement patients. The content comprises four sub-parts: Life before surgery, Waiting for surgery, Surgical care and rehabilitation, and Life after surgery. The course includes online contact, independent study and task completion in groups. |
| 3 | Häme UAS | Financing a Business | Objectives and principles of financial markets, corporate funding and factors affecting financing decisions. The idea is to apply an open learning environment. Students are able to add the perspective of factors related to financing decisions to their own enterprise. Students are adult learners – harnessing their experience increases authenticity in the learning process. |
| 4 | Humanities UAS | Gender and Media | The online course examines how media generates gender of children and young people, and what possibilities media education can offer to deal with the subject. Content: gender construction in the media, relationship between gender and media education, relationship between gender and youth media culture. |
| 5 | Jyväskylä UAS | Swedish language | By the end of the course students are able to talk about themselves and their education in Swedish, are able to navigate job applications in their field, key work tasks, and customer contact situations. Contact teaching covers oral content and students build work related vocabulary and written skills in the online component. |
| 6 | Kajaani UAS | Exporting and Importing | Students improve their ability to interpret international trade documents, learn to draw up these documents and negotiate delivery and payment terms. The course is completed by doing tests, which are returned, and tasks in WebCT. Answers to the tasks are found in the learning material, htm material links and course book. |
| 7 | Central Ostro-bothnia UAS | Setting Up a Company and Planning Business Operations | Students progress to a business idea by reflecting on their entrepreneurial characteristics. The business idea becomes an executable business plan through the learning tasks. Course participants engage in cooperative work, e.g., consideration of questions in online discussions. Links and material are connected to official websites of each field and, e.g., sites maintained by entrepreneurial organisations. |
| 8 | Kemi-Tornio UAS | Anatomy and Physiology | Students learn the structure and functioning of the urinary, digestive and reproductive systems, and hormone production of the thyroid gland, the pituitary gland and the pancreas. Lectures, pair and group work and dialogue are employed as learning methods. The learning tasks and discussion topics for studied subjects can be found in Moodle. Virtual contact lessons and discussions are conducted through Learn Linc. |
| 9 | Lahti UAS | Information Systems Analysis and Design | The student becomes familiar with the importance of information systems in a company's business operations - the phasing of building information systems, analysis and design of an information system and database design. Most of the exercises and assignments are done in small groups with both English and Finnish speaking students. |

| | UAS | Course | Description |
|---|---|---|---|
| 10 | Oulu UAS | Public Health and Multi-Professional Cooperation | Students become familiar with the central challenges facing Finnish public health, the social and health care system, strategies underpinning practice, and multi-professional work that advances health care. Beginning students (200) are from various health care degree programmes and the Faculty of Medicine. Students work in 8 virtual teams under the guidance of a tutor. The course ends with a student conference conducted using a scientific conference model. |
| 11 | Pirkanmaa UAS | Development Psychology | The course forms part of vocational studies in social services and aims to equip students with the ability to understand the psychological and social functions, changes and interactive phenomena of childhood, youth, adulthood and senior years, advance understanding of the main developmental theories and apply knowledge to client work in the social services field. |
| 12 | Vaasa UAS | Leading Multicultural Networks | Students learn essential concepts of multicultural networks and network leadership - terminology, different types of network organisations, networking skills and leadership in a new era of networks. Different types of team work and communication. Acquisition and analysis of information. Self-study and assignments. eLearning in Moodle. |

In benchmarking, reflective practitioners together with their peers evaluate and develop online education practices, as defined by the goals teachers set in the initial project survey. As noted by one teacher: "I want to learn from authentic learning and share my skills in a community of peers" (Teacher 3, t3). This is a question of partnership, interaction and learning based on equality. Benchmarking includes comparison of, and interest in, how others teach online. One's practices and outcomes can be mirrored against what is learnt about another teacher's online education practices and course, or as one teacher said: "I want to discover what my outcomes are like in relation to others" (t1). Teachers could decide whether to transfer good practices encountered in the project into their practice and how teaching could be developed from this basis: "I want to use the feedback to improve my teaching" (t2). Benchmarking is a learning process, through which good models are learned from others and development challenges are set for our own activities (e.g., Jackson, 2000; Karjalainen, Kuortti & Niinikoski, 2002).

The method was three-phased, including asynchronous and synchronic interaction:

1) Benchmarking pairs familiarised themselves with the comparative evaluation material in advance in the Ning environment. In most cases there was an opportunity to become familiar, in the internet (or virtually), with each other's course implementation.
2) The virtual benchmarking session was implemented in Acrobat Connect Pro. One teacher presented her/his course, her/his pair commented using the criteria, and the course was then discussed by all participants.
3) A 'post mortem' discussion continued in Ning.

Challenges set by authenticity for virtual education were considered using the benchmarking method: UAS teachers presented their courses, mirroring them against the elements of authentic learning, received peer feedback and gained an understanding of the elements through developmental collegial dialogue. A new benchmarking process realised through virtual sessions and social media work methods was also developed to support teachers' skills.

## Implementation of the study

The study aimed to observe implementation of authenticity in the VBM Project's peer evaluation courses, with the focus of interest on how the course was seen to support authentic learning. The research question was: How did teachers evaluate implementation of authenticity in the examined courses as mirrored against the authentic learning criteria?

The main research data comprised recordings of benchmarking session discussions (n=8, 6 sessions in Spring 2008 and 2 in Autumn 2008), self-evaluations using the authentic learning evaluation criteria form (n=5), and pair evaluations (n=5). The recordings were saved in the Ning environment. Other research data included course descriptions on the application forms, initial survey of open-ended questions (n=7), expanded course descriptions for presentation in virtual sessions, benchmarking chat discussions, discussions conducted in Ning (prior preparation, questions on own course for pair, questions for pair regarding her/his course, and summary discussion), and the final questionnaire (n=13). At the conclusion of the benchmarking sessions, a summary was drawn up of all the collected data. The research methodology was qualitative content analysis supported partially by a quantitative examination of elements. Implementation of authenticity is described and compared applying Herrington and Oliver's (2000) elements, which form the research analytical framework and thematic basis. Discourse was carried out with earlier authentic e-learning studies.

Accumulation of research data has been affected by the voluntary nature of participation in the project and lack of recompense. Only a few institutions provided teachers with the 25 hour resource required for the project. Therefore,

participants could not be expected to produce full and comprehensive research material, for example, filling in of open-ended surveys and forms. The research data can be considered diverse and rich overall, resulting in a deeper understanding of the phenomenon. Research reliability was further ensured by asking pairs to check the summary produced in September 2008. Suggestions for changes were received from three teachers. The summary formed the basis for an evaluation discussion held with an expert consultant. The five teachers who participated in this discussion received feedback on their courses. The expert consultant has acted "as a critical friend" in our study. External consultation and evaluation add to the reliability of the research and results (cf. Gentry, Denton & Kurz, 2008, p. 365).

## Results - Implementation of authenticity in the VBM Project courses

### Authentic context

Each course, as far as possible, has sought to produce a working life-oriented context. Courses received an average of 4 for working life orientation in self-evaluations and peer evaluations. One teacher understood authenticity to mean "an environment where as genuine as possible work practices, methods and means allow students to learn the knowledge and skills required by their chosen occupation" (t2). Another teacher defined authenticity as a "clear and comprehensive working life-orientation connection, reflected in the implementation and teaching from start to finish" (t3). Authenticity is "the connection of teaching and interaction to authentic practical contexts" (t4).

The examined courses are closely linked to occupational areas (Course 4, c4) and authentic contexts have been created through examples (c3, c5). Progress in the virtual environment models workplace processes, for example, drawing up a rehabilitation plan for a hip replacement patient (c2). Especially with adult learners, problem solving was tied to their own business or work setting (c7, c3). Example enterprises were also made use of in creating authentic contexts. On some courses, tasks illustrated simplified real situations. The implementations, for example in health care, encouraged taking up work and working cooperatively. The starting point then is multi-professional, as students represent occupations with cooperative work practices (c10).

Creating a genuine context was more challenging on courses with theory-based material (c11). These courses do not readily provide settings for an identifiable use of knowledge. Problem formulation, related tasks, and the quality and quantity of student interaction often determine how the context becomes more authentic. The challenge is to create contexts for the genuine use of knowledge application in problem solving. Several courses had quite a linear design. This caused discussion on increased flexibility in pathways so that students can return to studied content as needed and progress at their own speed. If several different virtual learning environments are being used and the course also includes contact teaching, the challenge is integrating and blending the various methods (Oliver, Herrington & Reeves, 2006; Garrison & Vaughan, 2008) so that a coherent learning space is created. Learning spaces are created as participants communicate and exchange ideas, experiences and emotions in reflective and authentic ways (see Docherty, Boud & Cressey, 2006; Boud, 2006).

### Authentic activities and tasks

On most courses, tasks were linked to real life, and constructed as examples of an occupation's core skill areas (c2, c6). However, sometimes the teacher had structured a task into a series of small sub-steps which deprived students of the important process of defining the steps needed to complete the task. Some courses required more time and effort to be spent on tasks, requiring students to investigate a diverse range of materials and detect knowledge from several relevant and authentic sources (c10, c7, c4). Outcomes included a workable business plan (c7) and a conference book containing a summary of each group's work formed on a learning platform (c10). In one implementation (c12) there was a diverse range of task types that were logically connected to each other so that one learning process provided the foundation for the next. A more sustained period of work and effort was then required.

A deficiency raised in the evaluation discussion was that students did not need to locate information beyond that supplied by the teacher in the online material. Only a rich and diverse pool of source material promotes a critical assessment of knowledge relevance. A strength of the courses was the multi-disciplinary nature of tasks (c2, c10, c6, c7), however, it was more apparent in self-evaluations (4.4) than pair evaluations (3.8). On one course (c9) tasks were completed as multi-national group work in which working life communication and work tools were applied (cf. Woo, Herrington, Agostinho & Reeves, 2007).

Teachers who responded to the initial survey believed they had implement authenticity best in the tasks (71.4%). Self and pair evaluation views on the authenticity of course tasks were quite homogeneous, with an average grade of 4. Teachers evaluated task scope as more extensive and demanding than did their peers. Discussion on the significance of task scope in implementing authenticity noted the impact of teaching arrangements on implementation feasibility. A more complex task requires more project-like teaching and a change in thinking on curriculum.

**Expert performances**

Access to expert performances and the modelling of processes was primarily provided through authentic and up-to-date online material. Teachers thought their courses offered little opportunity to move among different levels of expertise (2.8), their peers evaluated this more positively (3.8). In some courses, genuine cases, expert forums and blogs were utilised. Students investigated content through cases, modelling expert thinking. Two implementations (c1, c2) employed outside experts in addition to the teacher, for example, an individual who has undergone a medical procedure (informal peer support) described the treatment process from the patient's point of view. Students could present questions to the expert or, for example, conduct an entrepreneur interview (c7). In one case (c2), a working life expert was involved in course design. Learning material contained a plethora of links to expert organisations, for example, websites maintained by entrepreneurial organisations (c4, c6, c7).

Strengthening expertise on courses requires collaborative work methods, and in some cases, teacher resources were combined (pair teaching c9, several tutors c10). A close relationship with experts in the field can also be formed through the teacher (c6). Personal contacts are significant when establishing and maintaining links between entrepreneurs and academics (Välimaa, 2006). The experiences of adult learners also contribute to working life expertise. Learning through experience facilitates reciprocal learning between learners at various stages of expertise, making better use of this expertise. Senior students could be employed as a support when establishing a learning community in which expert thinking is modelled and investigated. Accessing and utilising learners at various stages of expertise is a largely untapped method. It is complicated by our traditional learning and operational culture, which supplies ready-made answers more than defining incomplete activities. Students are afraid to express incomplete thinking. Exceptions to be found in the courses were peer evaluation of posters (c10), the use of wiki tasks where developing outcomes were visible to others (c12) and tasks begun by someone else and continued by another (c8).

How can students be brought into discourse with experts and how can they be encouraged to reveal different stages of expertise? Collaborative work should be practiced together and students encouraged to reflect on the learning processes of experts. Learning takes place precisely when learners, at various stages of expertise, engage in discussion as this is when questions and thoughts arise, leading to debate and the defence of a position or belief.

**Multiple roles and perspectives**

Multi-professional perspectives were a strength on seven of the examined courses. Two courses integrated a multi-cultural and multi-professional point of view. Colleagues assessed fewer multiple perspectives on courses (3.8) than did teachers in their self-evaluations (4.4). Multi-professional teams were formed on some courses by combining different student groups (even from different institutions) and content was applicable to other disciplines (c2, c5, c10, c12). The participation of experts and genuine cases made possible the exploration of issues from many different roles (c1, c2).

On many courses (e.g., c4, c6, c7, c10, c12) students sought knowledge from various sources and had access to different resources, (e.g. official websites of organisations etc.) in their field. Task formulation also made familiarisation with a topic from different perspectives possible (c5) and knowledge from several disciplines had to be applied (law, business finance, English, accounting, c6). One course provided several perspectives: an IT professional and client perspective into which was also integrated multiculturalism and communication in a foreign language (c9). Multi-professionalism was highlighted through the backgrounds of adult learners and UAS students (c3, c7, c10). Interactive work in which team members investigated a problem in different roles was also a method employed on some courses (c1, c2, c6, c9, c10, c12). Implementation of multi-professionalism was hindered by traditional study rhythms and coordination of schedules. No convenient time was found for construction of knowledge. One exception was the case in which knowledge was constructed by completing tasks together, with students continuing the work begun by other students (c8). An interesting observation was that beginning students were more ready to work cross-professionally (c10) than students who had studied for several years, the latter having already established a professional identity. A further problem appeared to be the large numbers of students and short study time in relation to the extensive content, resulting in insufficient time to deal with different roles.

**Collaborative construction of knowledge**

There was considerable effort towards collaborative work on the examined courses. Colleagues interpreted collaboration to happen more in *groups* (3.2), whereas teachers felt collaboration to occur more as a result of *individual effort* (2.4). Different models of and best practices in individual, pair, team and large group work were found in the project cases. Common questions and problems were considered in online discussions, which were focussed, for example, around themes (c10). Wiki tools and synchronous communication systems supported collaborative construction of knowledge (c8, c12). Students worked in pairs to plan their case and experts could participate in the dialogue, commenting or posing further questions (c1, c2). Group members helped each other and together found solutions as they completed tasks (c9, c11).

However, all teachers also raised problems with collaborative work, and provided suggestions for improvement. In the end, there was little profound interaction that supported the learning of others in pair and group work, as a convenient time for construction of knowledge could not be found (c2, c4). A development challenge identified was clearly linking discussions to the achievement of learning objectives. It was thought that construction of knowledge was strengthened, for example, through peer evaluation of, commenting on and supplementation of other sections (c7, c8, c12). There is an incentive to collaborate when the task cannot be completed without group effort (Herrington & Oliver, 2000). Collaborative construction of knowledge is supported through setting a diverse range of tasks, work method selection and timetabling (e.g., an intensive discourse period). Peer tutoring and collaboration among tutors supports a group processing of knowledge in a virtual community (c10). Independent online study is also enhanced by access to an abundance of rich expert material (c6) or working with outside experts for example in social media expert networks.

That students studying online are more likely to collaborate as individuals than as an actual group (cf. Herrington & Oliver, 2000; simple cooperation vs. collaboration) was evident in this project. The emphasis on individual work was also seen in assessment. Even though knowledge was constructed in pairs or groups, traditional individual assessment continued. A good, contrasting example was course structure, which encouraged evaluation of the entire group process (c9). If authentic working life experiences are to be promoted, more group responsibility should be allocated. Tools such as wikis enable monitoring of individual students' contributions to the final outcome for assessment, if required.

**Reflection**

Reflection can be described as both an individually-mediated and a socially-mediated process (Herrington & Oliver, 2002). The central question is how can reflection space be created for learning and how can time for reflection be guaranteed (Boud, 2006)? The benchmarking study revealed that many courses have insufficient time for reflection and reflection guidance, and questions promoting reflection were seldom employed.

Social reflection was evident in online discussions (c2), pair work (c1, c2, c4, c8) and in the peer evaluation of pairs. Collective reflection was also supported by the student conference (c2) and seeking alternative solutions in groups (c1). Individual reflection (*on*-action) (Boud, 2006) was supported by learning journals (c4), which researchers have found to be an exceptionally effective way to advance learning (see Herrington & Oliver, 2002). Comments and further questions of working life experts supported reflection, providing students an opportunity to evaluate their skills in relation to expert skills (c1). Reflection was supported by self-evaluation (c5, c12), peer evaluation (c4, c1, c12) feedback given by teachers (c7, c12) and the opportunity to return to resources and materials (c6, c9). Learning tasks also promoted awareness of one's skill level and orientation (c5, c8). Reflection *in*-action occurs largely through the decision making that is required in complex tasks, but it was also evident in tasks such as a conference summary that required a polished and professional product as an outcome (c10) (see Herrington & Oliver, 2002).

Progress on several courses was more linear in nature, with little evidence of returning to previous stages to reflect on what was already learned (cf. Herrington & Oliver, 2000). The lack of time to consider the impact of content learned in the various stages was raised in benchmarking discussions. It is good to reflect in this way to identify weaknesses and strengths in one's learning. Reflection could have a more goal-oriented structure and be phased in to online implementations. There was discussion on how reflection could be supported so that it is not reduced solely to 'burdensome' writing, as experienced by some students (see Saari & Leppisaari, 2008), but that reflective learning is also promoted through diverse educational technologies (see Jonassen, Howland, Marra & Crismond, 2008). Very often students lacked an opportunity to compare outcomes with each other, this opportunity being clearly present on only a few courses (e.g., c8, c10). Teachers felt opportunities for comparison on their course were limited (2.4), whereas

colleagues evaluated this point more positively (3.4). The appropriateness of model answers in reflection was considered (c6, c7). For example, comparing model answers with student responses could be a requirement of independent study. Task design should more strongly focus on students demonstrating skills, comparing their ideas to knowledge produced by others and promoting dialogue in which they are required to think about their learning.

**Articulation**

When online study is individually oriented, articulation, expression and sharing of knowledge can be challenging. Pair work already requires collaborative handling of issues and the expression of growing understanding (c4). Articulation on the courses was supported by extensive discussions and expression of ideas in groups (c1, c7, c8, c9). Teachers thought their courses offered more forums for articulating ideas in groups (3.6) than did their pair evaluators (2.6).

Articulation continues to be largely based on written, asynchronous communication. In one implementation (c9), everyone was required to articulate thoughts and opinions and pose questions on the online platform. Articulation was evident as the posing of questions, comments, sharing of knowledge and argumentation. Skills were mainly demonstrated through text, but more diverse expressions of know-how will most likely be exercised as technology-enabled synchronous work methods become more common. The seminar or student conference in which group cases were presented (both orally and as posters) requiring a public presentation of one's understanding may be seen as supporting the expression and sharing of skills (c1, c10). Developments in educational technology and the expanding universality of virtual team work increases possibilities for articulation (see Jonassen et al., 2008; Finkelstein, 2006). Students seek theoretical knowledge, conceptualise issues and share acquired knowledge in various ways online (c2). On some courses, tasks were published in the learning environment for task pairs or the entire student group to access. In one course, the implementation of articulation was defined as the expression of ideas in a group and individually, and defence of solutions and choices relating to the task was outlined in the course requirements (c7).

Due to little reflection and interactive discussion on several courses, there was inadequate expression of ideas and extension of knowledge through discourse. One point raised was that a teacher with a very large group would have insufficient time to engage in deep and meaningful discussion in which thinking can be made visible. But is this teacher-centred approach the purpose of online education? A student-centred approach motivates them to articulate. Clear objectives regarding the expression, defence and sharing of ideas and knowledge need to be added to tasks. Wikis, blogs and online discussions achieve this aim well. Opportunities for students to defend final outcomes should be created. Articulation skills are central skills required by contemporary working life.

**Coaching and scaffolding**

All teachers provided exemplary guidance and coaching to students. They had primary responsibility for guidance and were available as needed. They gave individual feedback on tasks (e.g., c7, c5). Teachers also saw their role as critical friend and 'sparring partner' (c8), and assisting the group as "senior expert" (c9).

Guidance overall appeared to be rather teacher-centred, but other guidance forms were evident. Attention was paid to student peer guidance on half the courses (50%) and teachers felt this form could be employed even further. Senior students were utilised on one course as tutors (c12). In both self and pair evaluations, there was consensus on the insufficient utilisation of peer guidance in which more accomplished students provide guidance and support. In some cases, professionals or clients participated in guidance (c1, c2). Guidance was also supported by teacher pairs, tutor cooperation and teams (e.g., c10). Reciprocal goal-oriented scaffolding among student pairs was not evident in these implementations (cf. Herrington & Oliver, 2000), but the collaborative work of the group partly met this objective. The need to recognise the importance of guidance as an even clearer thread in the learning process was raised in benchmarking discussions. Therefore, peer guidance, senior students and working life experts need to be utilised further as a guidance resource (cf. Leppisaari et al., 2008). Tasks and problems to be solved should be constructed so that their completion requires seeking guidance from experts and expert organisations (c6), including outside the course. Expert work can be found in TV programs, websites, and is also visible on the streets, in shops, in client contacts, and so on. Diversity needs to be utilised and observed, and experiences and questions brought to a common forum.

**Authentic assessment**

Course assessment was largely teacher-centred and concentrated on individual assessment. Teachers felt they employed more process evaluation on their courses (4.8) in which assessment is seamlessly integrated with the activity and work

during the process than did their colleagues (3.8). The teacher sometimes assessed each task and gave feedback through the learning platform (c6, c7). There were several good examples of diverse assessment forms. Some courses included an evaluation completed by the teacher and peers as well as a final exam (c3, c4). Assessment was also based on work during sessions, online tasks and an oral exam (c5). Peer evaluation was employed and in some cases professional, working life representatives participated in assessment (c1, c9, c10, c12). Criteria for standardised continuous assessment are lacking in many cases and teachers in benchmarking discussions considered how continuous assessment could be built into the course and how assessment criteria could lead to polished outcomes.

At its best, assessment is integrated into the activity (c9), tasks are sufficiently extended and arise from working life needs (e.g., c1, c10) and progress in such a way that knowledge acquired in previous tasks is necessarily utilised in further tasks (c7). Assessment focuses on learning complex tasks, not discrete facts (c8). Going through individual tasks together was a desired objective, which concurrently supports learning in the entire group.

The multi-professional assessment of collaboration demanded by working life requires new methods and forms. Suggestions for assessment that reflect the world of work included assessment as worked out by a virtual team, virtual team meetings and a joint presentation of the final product for assessment (discussion c9, c12). Linking continuous assessment to a course means considering assessment criteria in the planning stage. The learning process should form a foundation for learning and outcomes should be assessed throughout the process and not in a final summation. Assessment currently is largely based on written presentations. Opportunities for, and different forms of, oral presentations need to be increased in the virtual environment and integrated into assessment.

## Discussion

A diverse range of courses, with many good solutions and practices supporting authentic learning, was presented in the VBM Project. The elements of authentic learning were realised evenly in the examined data. The results cannot be applied more generally to virtual education in universities of applied sciences, as the sample was the result of an application process, more than likely resulting in a representation of courses self-evaluation had deemed to include good practices.

The strongest elements evident in the courses were authentic context and tasks. Collaborative construction of knowledge, reflection, articulation and authentic assessment were also realised, although inconsistently or weakly. One teacher summarised the result as follows: “It seems that collaboration and reflection are either realised poorly or not at all on my virtual courses. The other elements are now realised fairly well.”

There was, on average, consensus between teacher self-evaluations and benchmarking pair peer evaluations. The greatest discrepancies related to establishing a sense of community and assessment of the process of investigation. Teachers felt a sense of community was realised on their courses more strongly, and processes were assessed more weakly than did their colleagues. It should be noted that benchmarking pairs were not able to observe actual teaching, rather evaluations were based on familiarisation with the course on the Internet and presentations and descriptions provided by teachers.

Many issues that still need to be investigated and developed were raised during the benchmarking process, for example:

1. Changing tasks to overarching complex problems with clear sub-goals. Students should be given an opportunity to construct objectives on how the final outcome will be achieved. Authenticity according to one teacher is specifically that “a student can define the limits and methods of his/her learning” (t1).
2. Flexible mobility between individual, pair, team, and large group work during the various stages of the course. Individual pathways and collective learning experiences should be evenly offered.
3. A diverse, effective, economic and influential use of experts would benefit courses.
4. Utilising new interactive work methods (e.g., video clips of genuine workplace situations, mobile learning forms). Simultaneous and non-synchronous use of online learning to use these tools would strengthen authenticity.
5. Creating time and space for collaborative construction of knowledge and reflection.
6. In addition to teachers, guidance should also utilise team teaching, tutoring, mentoring, peer guidance – all the internal peer resources of a learning community (such as students already in the workforce), and outside experts.
7. The challenge in assessment practices is to create continuously developing assessment forms of genuine products.

Teachers felt that obstacles to developing authenticity in teaching were lack of time, resources and contacts (t1, t2) and a narrow or incomplete understanding of authentic learning (t3). Other reasons were demands set by the curriculum and the pedagogic work culture engraved on it (t7, t6). The VBM Project research data indicated implementation of authenticity demands collaboration and a change in thinking from teacher-centred learning to student-centred learning (t5).

The elements of authentic learning were understood through exploration and dialogue on online education practices. Learning from peers, and heuristic elements of authentic learning supported the learning of teachers. The benchmarking method helped to raise, and make more widely known, good authentic teaching practices and authentic material in the UAS network and provided tools for evaluating authentic online education.

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