Competence learning in a virtual company: a paradigm shift in education.
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Abstract
One of the most striking problems in the field of (higher) education is its poor match with professional practices. Although there are many crossrelationships, education and professional working are still regarded strictly separated realities. To bridge the gap between education and professional working the Open University of the Netherlands developed the concept of a "virtual company", serving as a distributed, virtual learning environment. While representing the functional structures of real-life companies, the virtual company offers students a rich and meaningful context that resembles the context of professional working in many respects. Students adopt roles that are based on authentic (professional) function profiles that cover a specific set of competencies. The virtual company offers an authentic environment, that is, an open system in interaction with real customers, real suppliers, real resources and real social networks. As a consequence the virtual company differs in many respects from regular role-playing games, practicals, simulations and various forms of apprenticeship learning. The openness and authenticity causes the teacher's control ~~on~~ of what, how and when students learn to become much reduced. In fact, within the virtual company students are immersed in a distributed learning community which in many respects shows an autonomous development in interaction with the surrounding world. This feature represents a veritable paradigm shift concerning the roles and behaviours of teachers and educational institutions; it requires reconsidering the way students are to be guided, supported and assessed. A first pilot experiment shows some conflicts between the chaos and complexity of reality and the desired structure for the learning processes. Yet, our first findings are quite promising.

Introduction
In the first half of 1998, the Open University of the Netherlands established a company in the field of environmental consultancy. Because of its location in cyberspace and the use of networked communication, it was called the "virtual company". In contrast with ordinary companies, it pursues educational objectives rather than commercial objectives. In fact, the virtual company serves as an educational vehicle for competence learning. Its employees are unsalaried students that have to run the business, that is, they develop knowledge-centred products and services on behalf of external customers. This project aims to bridge the gap between education and business, between learning and working, between theory and professional practices. To ensure the quality and effectivity of learning, the virtual company comprises a sophisticated educational support structure. This paper outlines the design of the virtual company, reports on the first pilot experiment and discusses preliminary results.

Reality, no game!
The virtual company differs in many respects from regular role-playing games, practicals, simulations and various forms of apprenticeship learning. It claims to be reality. It offers an open system in interaction with the outside world that closely resembles the student's future workplaces. The richness, natural complexity and authenticity of the shared environment ensures valuable learning experiences: the domain of formal knowledge, as stored in written texts of books and articles, is extended to a great deal into the realm of informal, implicit knowledge associated with practical situations. While working closely together in teams, students can continually test their experiences against those of

others. Working and learning of students are highly integrated activities (Westera & Sloep., 1998).

Systems design
The virtual company's business inputs comprise orders of external customers as well as novice students applying for a post. Its outputs are knowledge-centred products and services as well as competent students (experts). This duality strongly matches common ideas on knowledge-centred business, human capital, human resources management and personnel development.

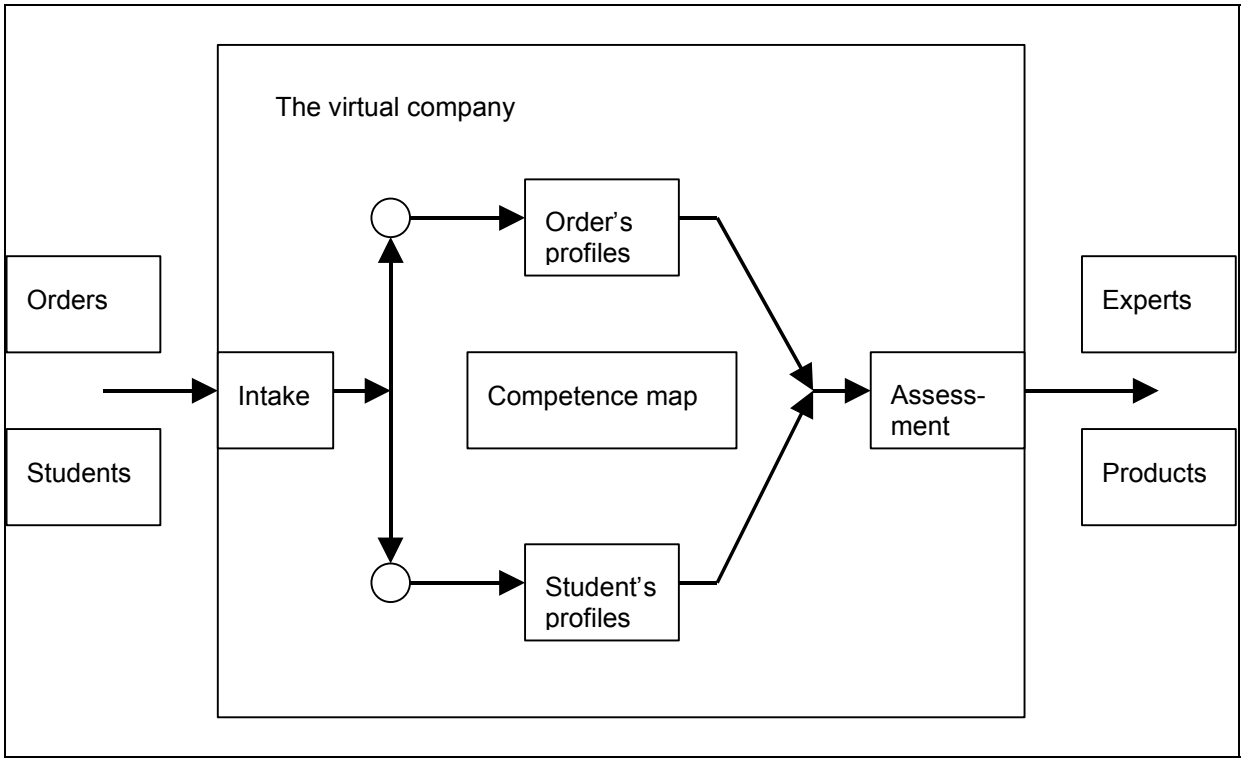

Figure 1 Process flow in the virtual company

For a virtual company in any domain, the starting point would be a competence map: an exhaustive inventory made of relevant competencies and its interrelationships. The competence map acts as a frame of reference for all processes involved, while it sets the boundaries for the range of products and services and it defines the final attainment levels of the educational system. The intake of new orders produces a competence profile for each order that identifies the competencies involved. Similarly, the intake of new students (employees) produces an initial student's competence profile, showing competence gaps and performance levels. Business tasks are allocated on the basis of a match between required competencies and pursued competencies (Westera, Sloep & Gerrissen, 1998).

Guidance and support structure
Students in the virtual company is given a great deal of autonomy. While being immersed in an environment with a natural complexity, they are assumed to be highly responsible, self-reliant and independent agents. Clearly, such a realistic environment requires a substantial support structure. In comparison with ordinary companies, the virtual company disposes of outstanding facilities to realise an improvement of individual performances. These include relevant sources of information, instructional materials, individual coaching and extended training facilities, all of which are to be just-in-time available.
Educators themselves take up roles in the virtual company as well. The "competence

counsellor" adopts the role of a personnel officer that guards the individual student's career policies. The role of "general manager" will also be performed by an educational staff member, be it that this character partly serves as a security measure of the educational institution that allows it to overrule unwanted student's behaviours or to intervene in the student's company policies.

Assessment
In the virtual company, an extended student intake, monitoring and assessment system is operative. The intake produces a competence profile and a long-term career plan for each student that forms the basis for future task assignments. The competence-based performance assessment includes traditional teacher controlled evaluation procedures as well as methods for self- and peer-assessment by the students themselves. Eventually, all relevant information is collected in a personal port-folio that is used for establishing and formalising attained performance levels.

A pilot experiment
The first operational virtual company was named "Incompany environmental consultancy". Its employees were 14 advanced students of the academic program on environmental sciences (Sloep, Westera, Jansen & Gerrissen, 1998). These students were experienced distance learners, but had only little experience with collaborative learning and with computers. Educational staff was represented by a general manager, three competence counsellors and a helpdesk officer. The experiment lasted about 12 weeks, with a total study load of about 100 hours. Students were equipped with a standard 300 MHz Pentium PC to access the standard web-representation of the virtual company, which comprised all relevant information: the applied business model, including a mission statement, a business philosophy, a range of products, organisational structure (project organisation), job descriptions, house regulations and the support structure, including an archive, references to relevant literature and available experts, instructional materials (fact sheets) and training facilities.

Figure 2 Presentation of employees at Incompany Environmental Consultancy's extranet.

Communication software covered both synchronous and a-synchronous communication between fellow-employees. It was supplemented with groupware facilities (BSCW). Students were allocated to one out of four 4 project teams to work on authentic, third-party orders.

Conclusions

Evaluation of the pilot experiment shows that the integration of learning and working in a virtual company is highly motivating. Students were greatly committed and appreciated the "thrill of reality". Collaborative learning via the network appears to work quite well, despite a few initial technical problems. Indeed, learning and working appeared to be highly integrated, though sometimes the students indicated to give priority to the customers interests at the expense of their own interests. At the start of the pilot, students complained about the overwhelming amount of information; it clearly hampered the students functioning. In addition, students as well as educators reported some confusion about the various tasks and roles. It would be cynical to state that this confusion is a desired artefact of introducing reality. Nevertheless, it is concluded that a better balance between chaos and structure could be strived for. The tools for performance assessment and task assignment were quite troublesome. One might urge in excuse that this virtual company was started out of the blue, lacking a common history, an existing culture and common behavioural patterns. Yet, improvement and fine-tuning of these tools are foreseen in the coming period. In the course of 1999 some additional experiments will be carried out, to test the validity and flexibility of the virtual company concept. Our first findings are quite promising.

References

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