ILLUSTRATION: TYGRON

Players of the game 'Simport' can reorganise the Second Maas Area.

Games for science

Higher education is cautiously exploring a new educational tool: computer games. Educational computer games were recently the focus of a symposium held in Delft. Will we soon be giving and following courses, lectures and trainings in a virtual 3D world, instead of in lecture halls?

TOMAS VAN DIJK AND MAARTEN KEULEMANS

The Second Maas Area in the year 2036. Viewed from above, the harbour consists of flat, right-angled plots of land. We swoop down. Container terminals appear. The outlines of a shrimp factory, a nursing home and a power plant are visible in the distance. "We'll reach the breakeven point around the year 2040," predicts Erik van de Luytgaarden (23), who, the scoreboard reveals, is still deep in the red. As part of his Master's degree course *engineering and policy analysis*, Van de Luytgaarden and his five teammates used the 'SimPort' computer game to design the future harbour area in just one day.

Serious game is the name for such games, and they aren't meant to be played for fun, but rather for educational purposes, for supporting policy initiatives or training professionals. Researchers at the Faculty of Technology, Policy and Management (TPM) were hired by the Port of Rotterdam and gaming company Tygron to create the game 'Simport'. 'Simport' reveals the results of various long-term organisational strategies.

"There are various strategies," explains game instructor Geertje Bekebrede. "Players can immediately start building and raise money among previous clients, or they can wait for lucrative offers. At the same time, you must plan for the unexpected, like the economy collapsing."

He laughs: "This year, we've also added Colombian drug barons as clients. They pay really well, but the question is: do you really want to have them on your premises?"

"Games for higher education and for training professionals are hot," says Dr. Igor Mayer, a university instructor in public administration and the director of the *Center for Process Management and Simulation*. For past few years he has supervised the harbour game 'Simport'. "These games fit in nicely with the experiences of young people who grow up playing *fun games*, like 'WORLD OF WARCRAFT' or 'SECOND LIFE'." These are the so-called MMORPG-games: *Massive multi-user online role-playing games*, which millions of players can play simultaneously. Mayer believes that it is only a matter of time until the lecture halls are filled with the 'games generation', who want game-based learning.

Lifelike

Game-based learning is as least as old as the road to Rome. Ages ago Chinese warlords played out games with full battlefields, in order to devise victorious strategies before blood was spilled in the real battle. More recent examples that come to mind are the disaster-trainings that use 'real' actors; the courses in which participants play roles to learn how to deal with aggression; or even the notorious

Life 2.0

You can walk around, talk, move into a house, trade, work, shop – and now even attend law lectures at Harvard University. The population of the virtual world 'Second Life' is exploding: this 3D Internet world's population has increased fourteen-fold in the past six months, from 150,000 to 1.5 million residents.

"Reuters Press Agency now has a journalist permanently residing there, and many large companies use this medium as a portal for demonstrations and transactions," says Tom van der Maas, director of EPN: Platform for the Information Society. "Second Life is increasingly being regarded as a new, extremely user-friendly interface, in which you can do all kinds of things collectively."

University instructor Dr. Igor Mayer also expects Internet games to continue acquiring more serious applications. Thus, 'Second Life' now has at its disposal 'Edunation', a virtual island where the educational possibilities of 3D role-playing are demonstrated. "This will absolutely be big. It is in varying degrees a mixed reality-like environment, in which you can increasingly do more with combinations of gaming, chatting, video, audio, PowerPoint and other features."

prison experiments that psychologist Philip Zimbardo conducted in the basement of Stanford University in the summer of 1971. Viewed in this light, computer games are hardly unexpected. Until recently, the flight simulator had been the most important contribution thus far, but thanks to the games industry, people now have access to increasingly finer designed, visually lifelike educational games. And not only are games becoming less expensive, but they keep getting better at impacting situations like dikes breaking, evacuation methods or complex public administration issues.

Mayer has no doubt that in future *serious games* will have an even greater impact on higher education. But he does not believe that they will render books and teachers obsolete, as some game gurus predict. Mayer: "According to the renowned American game-based learning expert Marc Prensky, the young people of today only play games, and therefore you can no longer send them home with armfuls of books. But I doubt this, as well as his assertion that instructors barely have a role left to play." Meyer has worked on the two-year Surf-project Kodos (Knowledge development about and through online simulations). Together with his colleagues from Erasmus University Rotterdam, the University of Leiden and the Hogeschool Rotterdam, he studied the ways in which online game simulations can benefit higher education. The project was recently completed with a symposium in Delft: 'Game-based Learning in Virtual Worlds'.

Combining the real and the virtual is of course also possible. Take the game 'Sieberdam', for instance. The name stands for a virtual city that needs to be reorganised. The game is played partly via Internet and partly face-to-face. At TU Delft's TPM Faculty, game-based education is used to teach second-year students about the ins and outs of 'decision-making, management tools and the law'. After first becoming engrossed in the various games on the computer, the students then play out the various 'Sieberdam' management issues in a seven-week long role-playing exercise. "It's better to simulate the decision-making processes face-to-face," says Dr. Joop Koppenjan, who supervises the students.

Computer games are exceptionally good at simulating urban planning problems, according to TU Delft building information specialist Dr. Peter Paul van Loon. He created the game 'URBAN DESIGN & DECISION ROOM', in which students play the roles of project developers, taxpayers, urban planning experts and property owners.

Van Loon has no doubts about the importance of instructors. "My games are primarily meant to discover the complexities of urban planning design issues. An instructor is always needed for checking the hypotheses and directing the students toward achievable design solutions."

Van Loon does believe however that universities should devote more attention to serious games. "At home, students play games that are – at least in terms of appearance - much more advanced. They are a bit spoiled. Higher education institutions like TU Delft must find the right balance between fun games and serious games."

More information: Igor Mayer, tel. (015)2787185, i.s.mayer@tudelft.nl; Peter Paul van Loon, tel. (015)2784084, p.p.j.vanloon@tudelft.nl

Dikes are breached in the serious game, 'Dijkpatrouille' (Dike Patrol), which was developed by TPM Faculty student Casper Harteveld during is internship at GeoDelft.

Serious sailing is also fun

A serious game can be really fun. Last summer the Rotterdam-based company, Vstep, introduced 'Ship Simulator' onto the market. It was meant to be a serious game for professional shipmasters, but the game was so attractive that many gamers began sailing through the Rotterdam harbour for the fun of it.

"And actually the game wasn't intended for this," says mathematician Dr. Kees Vuik (numerical analysis, EEMCS Faculty). "If, for example, you crash your ship into the harbour wall, the ship stays intact." Vuik and Vstep have since discussed the possibility of employing student interns to work on making the game more realistic. Vstep wants to add more variables to the game, such as tides, wind, waves and various ship names. "For us, that's an interesting challenge. We have lots of experience with simulations, but what's nice about such a game is that calculations must be made within milliseconds," Vuik says.

Additional benefits: games are alluring for students, and they can be useful in conducting scientific research. "We also possess a lot of knowledge about shipbuilding at TU Delft. So you can imagine that they are also extremely interested in tapping into that."