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 **Building a Virtual Software Engineering University (Channel 18)**

As of 2012 the technologies exist to create a virtual-reality software university that would resemble a real university, only with more sophisticated access to learning materials.  The essential idea is to use concepts from virtual reality sites such as Second Life but apply them to practical software education topics.

In order to do this the process would start with licensing a virtual reality rendering engine from one of the sophisticated computer game companies.  But instead of using the engine to create virtual battlefields or forests, the engine would create what appears to be a university campus complete with buildings and students.  To be convincing a virtual campus would probably need to be aesthetically pleasing and feature landscaping as well as campus buildings.

Potential students would be able to move their avatars through the campus and enter the buildings.  For example there would be buildings labeled “ Project Planning and Estimating Department,”  Project Governance Department,” Project Requirements Department,” and so forth.

Upon entering one of these virtual buildings there would be a series of virtual class rooms and virtual offices for the instructors and professors.  This model assumes that live experts will be participate in the virtual university so the offices would have the names of actual experts such as Dr. Barry Boehm, Dr. Victor Basili, and others who entered into agreements to offer courses through the Virtual Software University.

Of course the instructional staff would not be present at all times, so office hours would be posted on the virtual offices.  In addition students would be able to leave messages and requests for the various professors and instructors.

The class rooms would appear to be actual class rooms similar to those at MIT, Harvard, Princeton, and other major universities.   Several kinds of courses would be offered.  One form of course would be presented in real time by the avatars of live instructors.  (It is assumed that the Avatars for the Virtual Software University would be images of the actual instructors.)  These live courses would be announced and could be scheduled.   Some of these would be free but others might be fee-based.

There would also be recorded course materials that students could download and use at home or at their convenience.

The virtual class rooms would be more sophisticated than most real class rooms, in that all of them would be able to have multiple screens, feature animation and dynamic materials, and possibly even use 3-D instructional materials.

Interaction between virtual students and virtual professors would be similar to real life, in that questions could be asked and answered.  Some of the interactions might be even more sophisticated than normal human interaction, since the Virtual Software University envisions working tools for topics such as planning, estimating, requirements, design, and of course working compliers and interpreters for teaching various programming languages.

Of course every university needs a good library, and the library for the Virtual Software University would be world-class.  It would have features not offered in normal libraries.  For example suppose a student is interested in the topic of “software testing.”  Not only would the library have abstracts of every published book and article on testing, but it would constantly be refreshed by means of intelligent agents that would scan the web for new materials.

Of course for many topics the number of books and reference items might be in the millions, so the library would also include tools for narrowing searches and for assigning relevance scores.

Since the Virtual Software University might be accessed by students from several hundred countries, there would also be real-time translation services between all major natural languages.  Thus courses might be simultaneously available in English, Russian, French, Italian, German, Portuguese, Arabic, Spanish, Japanese, and essentially every human language.

Ideally the translation services would encompass both text materials and perhaps even spoken discussions among students and faculty.  A sophisticated university such as the Virtual Software University would no doubt license language translation tools plus perhaps voice to text tools such as Dragon or one of the others.

It is obvious that the virtual software university would want to offer world-class facilities for those who might have physical limits.  For example to aid the deaf and hard of hearing all spoken material would be simultaneously translated into printed text.   All video and instructional films would automatically include close captions or subtitles.  This technology is available in 2012.  It would also be possible to offer simultaneous translation of spoken courses into sign language.  However translation of printed materials into sign language may not be fully available circa 2012.

For the blind all printed materials would be translated into speech.  This technology also exists in 2012.  It might even be possible to support simultaneous translation into Braille, although that is perhaps outside the state of the art as of 2012.

For those in wheel chairs who prefer that their avatars also have wheel chairs, the classrooms and buildings of the virtual software university would all be accessible to wheel chairs, and also clearly identified verbally for the blind.

As with real universities, students would be able to interact with one another and would also be able to participate in special interest groups or Wiki sites on topics such as static analysis, inspections, requirements engineering, and dozens of others.

Because quantitative information is sadly lacking in real universities, the Virtual Software University would have licenses from all major benchmark groups and would have working versions of a variety of planning and estimating tools, test tools, and many others.

Unlike real universities the Virtual Software University campus would be operational 24 hours a day 365 days per year.  Of course live instructors would take normal holidays and vacations, but the library and the recorded course materials would always be available.

Assuming global students and global faculty, it makes good sense for the Virtual Software University to operate around the clock.  After all it is always daylight somewhere.

Because topics of interest change fairly often, the Virtual Software University would include a “Student Center” where students from many countries and many fields could interact with one another in order to exchange information and find out what techniques are being used successfully and which ones are difficult to master.

As with real universities there would be many special interest groups or people who are all interested in the same topics.  One service that the Virtual Software University could provide would be access to local and national information from many countries such as the U.S., China, Brazil, Japan, India, and many others.   For example each country might have its own bulletin board that could be used to announce courses and webinars that are located in the various cities of the home countries of the students.

Another service that the Virtual Software University might provide is a daily summary of webinars on selected topics such as testing, requirements engineering, and new tools and methods.  Currently there are so many webinars offered that it is not easy even to keep track of them.

In the student center there would be a virtual bulletin board.  Here vendors of tools or services might place ads, and students with interests in special topics might start looking for “birds of a feather” groups.

The Software Virtual University might also use Linkedin or Plaxo or another network service to send messages to students with special interests or with common interests who might want to communicate with each other.

Since students would not be on campus more than perhaps an hour or two per day, the Virtual Software University would also include links to various e-book sources such as Amazon, Barnes and Noble, Google, etc.  Indeed course curricula and selected texts would be capable of being downloaded and ordered as e-book packages for various courses such as testing, estimating, project management, and the like.

The fundamental idea for the Virtual Software University is to consolidate the huge but unorganized collections of knowledge about software topics into discrete learning packages that are aimed at specific and important topics such as quality control, estimating, planning, status reports, and dozens of others.

Two other aspects of the Virtual Software University would be different from regular campuses.  First, each of the major professional associations such as the American Society of Quality (ASQ) or the Project Management Institute (PMI) could have their own virtual buildings and offer both training and membership services.

The same concept would be available for major corporations such as IBM, Google, and Microsoft.  They could design and commission corporate buildings on the virtual campus where training in their products could take place.  In fact some of the funding for the Virtual Software University would no doubt be the fees paid by corporations for these structures and for participation in the Virtual Software University.

Another unique aspect of the Virtual Software University would be links to major conferences such as the Japanese Symposium on Software Testing (JaSST) or the IBM Innovate Conferences.  The Virtual Software University would have several large conference halls where those who could not attend actual events in person would be able to participate in the major sessions and tutorials.  Attendance policies for these virtual conferences would be set by the conference committees, and would probably offer reductions on the fees for attending in person.

The early versions of the Virtual Software University would probably offer short courses or webinars that lasted only an hour or less.  However it is technically possible to envision the Virtual Software University linking to real universities and offering standard curricula in virtual environments.

If the idea catches on then eventually real universities such as Harvard and MIT or the University of Nalanda in India might participate and offer virtual courses either on their home campuses or through the facilities of the Virtual Software University.

At some point the facilities of the Virtual Software University would be sufficient to administer examinations and offer professional certification in topics such as requirements engineering, function point analysis, testing, project managements, and perhaps dozens of other technical disciplines where certification is available.

It is not impossible for the Virtual Software University to eventually award actual degrees up to the PhD level.  However that could only occur if the curricula and faculty were accredited.   Actual degrees from the Virtual Software University might not be feasible until 2030 or thereabouts due to the novelty of the concepts and the logistics of accreditation.  The initial versions of the Virtual Software University would be aimed at professional training rather than undergraduate or academic training.

Security would have to be included as part of the design of the university virtual campus.  This is to keep hackers and viruses from damaging the course materials or disrupting the sessions by means of denial of service attacks.

Although it may be 10 years or more before this kind of Virtual Software University occurs, it is interesting that the essential technologies to build the Virtual Software University all exist in 2012.

Not only do the technologies exist in 2012 but the costs for constructing a virtual campus would probably be only in the range of $150,000 which is much less expensive than building real class rooms.  Assuming that companies such as IBM, Microsoft, and Google who already have course materials and instructors wanted to do this, a Virtual Software University could probably be up and running within 90 days of starting out.

It is not impossible that the Virtual Software University could do for education what Face Book and Twitter have done for social networks; i.e. make learning so easy and enjoyable that attendance would reach into the millions.

Needless to say the concepts of the Virtual Software University could also be used for other forms of education such as medicine and law.  It is even possible to apply the same ideas to primary and secondary education.  Even in 2012 it would be much cheaper to build a virtual school for the deaf than it is to build such schools in real life.