

pnn ag

www.pnn.ethz.ch

Pharma Nation Network AG – CME online

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Abstract: pnn ag is a spinoff company of the ETHZ and has evolved from the ETH World project of the ETHZ (<http://www.ethworld.ethz.ch/>) with a close relationship to the Institute of Pharmaceutical Sciences. pnn ag has developed an internet platform, called the pnn-platform, which comprises e-learning modules for health care professionals. The company was founded in 1999. pnn ag provides accredited continuing medical education for the German-speaking area. It collaborates with professional health care organizations to offer attractive and efficient online CME by combining high professional competence and advanced technology as well as didactics.

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Setting the Scene

Knowledge production in life sciences has increased exponentially during the last two decades. A high impact on the generation of new knowledge arose from IT and its combination with molecular biology methods. The paradigm of drug discovery has been turned upside down, starting with molecular information of targets and extending to recombinant (designed) animals as disease models for testing the proof of concept.

Hence the periods of knowledge refreshment for the practitioner in health care have become shorter and shorter. Since

very often ‘time is money’, the first thing in order to save time, is to reduce ‘continuing medical education’ (CME), be it a pharmacist or a medical doctor, both in their competitive contexts.

The traditional setup for CME is that the professional organizations like the FMH in Switzerland or the Landesärztekammer in Germany require a certain number of credit points per year gained from CME activities. In Switzerland this is based on a new law from the beginning of 2002. Part of the credits (normally a minor fraction around 20%) are granted for self-studies, *i.e.* reading papers and books. The majority of the credits is acquired during seminars and conferences, workshops and professional meetings. This however requires overhead time. Taking into account the economical pressures within today’s health care system, fewer and fewer practitioners can afford to close their practices for the afternoon to travel to a bigger hospital to attend one CME lesson and attain two CME credits. On the other hand, it has never been more important than the present to be up-to-date in treatment and new medical results. Especially the increase in global tourism and its unpleasant consequences in terms of new types of infections require the permanent attention of all the players in a modern health care system. Thus, if we don’t want

state of the art knowledge to be reduced to economics only, we have to deliver knowledge instead of demanding that it be collected.

Delivering knowledge for health care practitioners by e-learning technology is the business concept of pnn ag.

Solutions Offered

pnn ag was founded on the concept that modern information technology (IT) is a suitable tool to distribute knowledge in an appropriate didactic manner to a specific group of users. This is generally termed e-learning or e-education, *etc.* The basis of pnn is a central database server that can be accessed *via* internet technology. The pnn virtual environment is designed in such a way that it fulfills the requirements of general physicians (GPs) in terms of individual required learning time, interactivity, user friendliness, quick response, and self assessment technology.

The Underlying Philosophy

What makes the difference between a good and a boring e-learning course? From several years of practice with electronic ed-

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ucation technologies developed for students we ultimately came to three simple points of insight and three consequences thereof:

1. Nobody is going to buy new IT equipment just to gain CME credit points online.
2. If somebody is interested in CME-online, he or she is primarily interested in the medical and professional content not in learning how to use an e-learning module on the internet.
3. Text is more legible on paper than on the screen. The same is true for pictures.

The consequences that follow from these observations are simple and form the basis of the pnn-server:

1. All e-learning modules have to be easily accessible, even with 'old' IT technology.
2. Each user has to be able to use the CME courses instantly no matter whether he or she is a computer expert or not.
3. There has to be an additional value that compensates for sitting in front of a computer screen without any social contact or informal exchange with colleagues. This can be done by either
 - a. allowing the user to access exactly what he wants (personalization) and track and show his personal learning success,
 - b. leveraging the possibilities of IT by offering, for example, interactive animations or 3D visualization.

Interactive schemes of receptor activation by a new drug for diabetes therapy make complicated processes easier to understand and are more fun to learn. Interactivity, starting events and stopping events on the screen, is an important tool for keeping data and processes in mind. You learn by controlling the processes.

'Linking' contents is the enormous advantage of the new IT, as it allows users to define the amount of information and detail that they receive. No traditional medium provides this functionality. By clicking an unknown expression or graphical element you are transferred to another knowledge base which provides an explanation or definition. It is like always carrying a huge encyclopedia with you, wherever you are, provided there is an internet connection.

In designing the internet platform, we had however to take into account some more points of insight that we learned by studying general continuing education. Granting of credits in traditional CME is based on lectures. Lectures usually last one hour including discussion. Hence, one credit point is equivalent in general to one hour of lecture. This is in harsh contrast to the time a GP usually spends online: research indicated approximately 12 min.

Therefore it is necessary to be able to fragment a CME course and to offer functionality that allows the user to resume a module where the last session stopped. So the learning platform has to know and show:

1. Which sessions have been taken so far to complete one module, and
2. What he or she has learned so far and in which fields more work is needed.

For the latter functionality in particular a quiz-based self-assessment system has been developed and implemented into the pnn platform.

Special Features

Visualization has already been mentioned as being very important for e-learning. As always there is some ambivalence. Whereas animated 'baroque masterpieces of art' may be most suitable for the illustration of complex contents, they have the disadvantage of being very large and needing both plenty of storage and plenty of time for transmission. Furthermore such masterpieces very often need special 'plug-ins' to appear on the screen and cannot be handled by standard internet browsers. Recent ex-

perience shows however, that non-ostentatious and simple presentations may fulfill the same purpose, provided they are carefully designed. Very often still pictures can be taken as a start and animation is only required if the user wants to go into a detailed inspection of the contents presented.

This has generated the advantage that pnn modules are carefully illustrated but always with the awareness that the illustrations can also be depicted on low-tech IT equipment and do normally not require the user to search and download and install fancy tools from the internet.

A second feature for which we invested some time for development is to ensure learning efficiency. High learning efficiency requires a learning module tailor-made for the learner. This is not easily achieved in conventional media. Here, the linked structure of the internet provides a matchless advantage (Fig. 1). The pnn platform has introduced functionalities which allows the most simple but powerful mechanism of tailoring: to stop a module and start again at the same point without losing anything, to fast forward in order to skip parts of the contents which are already known, to jump backwards in order to repeat (Fig. 2). More

Wirkungen des Insulins

Physiologische Aspekte: Insulinwirkung beim Nüchternblutzucker

Die Aufgabe von Insulin ist, den Blutzuckerspiegel zu senken, welcher vor nach dem Essen erhöht ist. Nach Nahrungsaufnahme wird jeweils vermehrt Insulin gebildet.

Die meisten Gewebe wie Muskulatur, Fett und Leber benötigen das Hormon zur Aufnahme von Glucose. Durch die physiologische Insulin-Wirkung kann Glucose rasch in die Zellen aufgenommen werden.

Insulin beeinflusst den Stoffwechsel der Kohlenhydrate, Proteine und Fette durch folgende Wirkungen:

- erhöht die Aufnahme von Glucose in Muskel- und Fettzellen um das 3- bis 10-fache
- steigert die Glykolyse
- erhöht die Glykogenbildung in der Leber und im Muskel
- verändert den Glykogenabbau
- stimuliert die Bildung von Proteinen und Fetten aus Glucose
- fordert die Aufnahme freier Fettsäuren im Fettgewebe und in der Leber
- wird der Fettsäureoxidation und der Lipolyse entgegen
- gezügelter Aufnahme von Kalorien
- Senkung der katabolen Wirkung von Glucocorticoiden und Schilddrüsenhormonen

angewandte Themen	relevante Themen	erweiterte Themen zu Wirkung des Insulins
<ul style="list-style-type: none"> Diabetes Mellitus, Pathogenese Diagnostik und Differentialdiagnose 	<ul style="list-style-type: none"> Stoffwechsel Diagnostik und Therapie des Diabetes Mellitus Diagnostik und Therapie des Diabetes Mellitus 	<ul style="list-style-type: none"> Diagnostik des Diabetes Diagnostik des Diabetes Diagnostik des Diabetes

Fig. 1. An introductory page on a course on diabetes therapy shows the graphical elements combined with a short text and the links in the lower part of the page.

ambitious tailoring mechanisms implemented include:

1. Background information on demand, for deeper insight in the topic of interest.
2. Change of topics, based on the results of the self-assessment.
3. Adaptation of the quiz levels in the self-assessment tools according to the learning success (Fig. 3).
4. Variation in the contents of the quiz, in order to avoid stupidly answering the same questions again.
5. Benchmarking technology for anonymous ranking of the user compared with all other users taking the same course. This fosters goal-oriented learning and self-responsibility.

Certification and Quality

Usually credits cannot be granted if the course has not been evaluated and accredited by the professional organization. This is at least true for the German-speaking part of Europe, where Kammern, Academies, and other professional organizations have taken over the responsibility from the state to guarantee the quality of medical education. We also had to face the inherent problem that the number of certification procedures is correlated with the number of granting organizations. Hence pnn has implemented a technology that is firstly able to trace the individual learning behavior and secondly to handle different granting criteria of the different organization for the

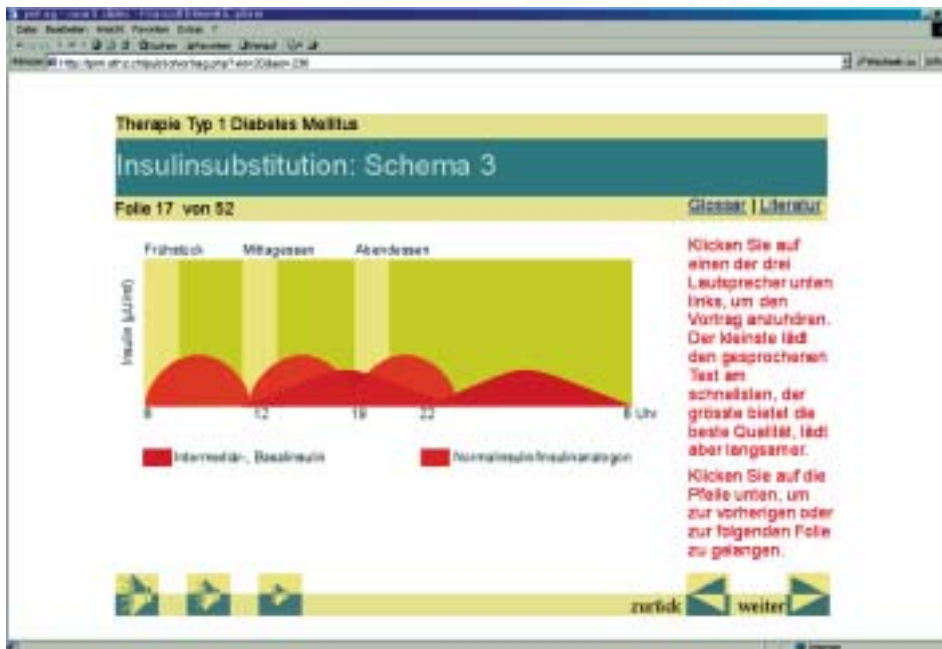


Fig. 2. Voice & Slides: Slides of a lecture on diabetes therapy can be viewed hearing the voice of the speaker in the background, explaining the contents of the slide. There is one sound track for each slide, which facilitates skipping single slides and repeating a lecture without the need to follow every part of it again.

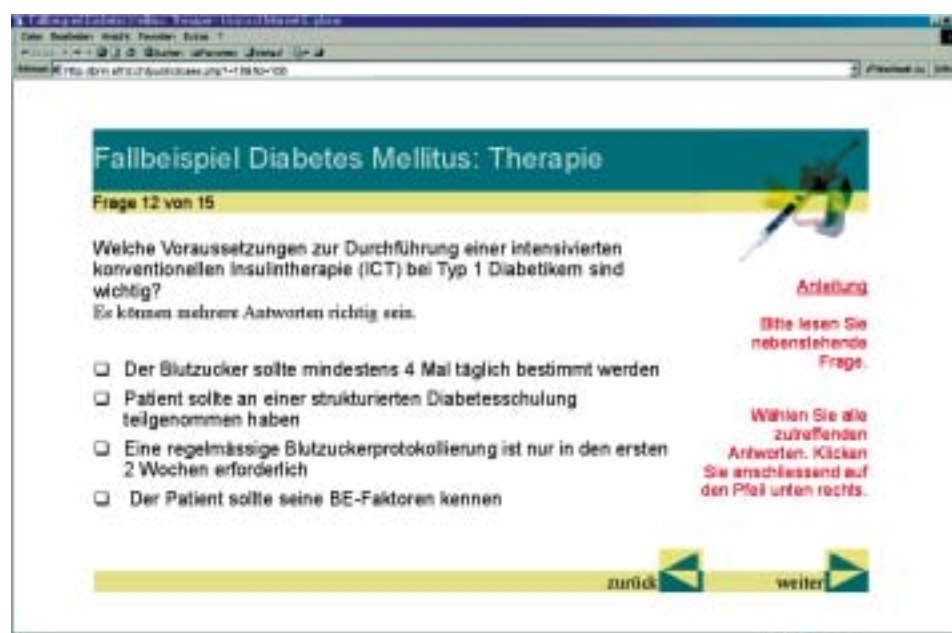


Fig. 3. Self-assessment by a pnn quiz. If a wrong answer is given, the learner is taken back to a recommendation and links for contents that should be repeated for answering correctly.

same course. Especially the latter enables the individual user to choose the appropriate CME system.

The comprehensive pnn CME-online in Diabetes has gained certification for four CME credits from five of the German Landesärztekammern, a recommendation of FMH, and the accreditation for Switzerland. At the moment more than 100,000 German-speaking GPs can gain CME credits with this course. By end of year the course should be accredited for the entire German-speaking region.

Besides evaluation by the professional organizations, the pnn-platform is controlled and given advice by an international advisory board of independent medical and pharmaceutical experts. Experts at the same level usually serve as contracted authors for our contents, be it in designing the case studies or in delivering voice & slides online lectures (Fig. 2).

Who is Going to Pay for This?

There is an almost worldwide consensus that CME should be independent and its contents reflect the scientific state of the art. Since sponsoring is usually paid by marketing budgets, any CME will raise money easier if it is in line with the marketing of its sponsors. This is why pnn ag avoids mono-sponsoring and has elaborated in cooperation with medical organizations a sophisticated sponsoring model that allows maximum freedom for the authors and the content of pnn CME. pnn avoids mono-sponsoring and keeps its sponsoring absolutely transparent. This approach is less lucrative than others and is based on the assumption that GPs assume a better quality of CME by paying a modest user-fee.

Who Actually is the Team?

pnn ag is a small startup company of the ETHZ. It employs a team of four people that combine skills in life sciences, IT, content development, and marketing. All other skills as well as contents are contracted in. This is especially true for the medical advisors, the authors contributing interactive case studies, the pharmaceutical contents, and interactive case studies from workshops and scientific meetings.

User Response

pnn ag has performed several tests to evaluate user acceptance of its courses. The peer groups were selected by medical or-

ganizations. The results of these studies were very encouraging: 30% rated 'excellent', another 70% 'very good' and 'good', none voted 'bad' or 'very bad'.

The Future

With its CME courses pnn ag is establishing co-operations with CME providers that offer courses with different media, to establish blended e-learning, combining the advantages of the different forms of education.

The course concept and pnn platform are not limited to courses in CME. So pnn is looking to expand its target audience towards other healthcare professionals such as pharmacists, nurses, educational programs in industry. In addition there is ongoing parallel research in didactics and technology of e-learning, collaborative teaching, virtual reality platforms at the ETHZ (<http://www.vireal.ethz.ch>), the results of which will be implemented at the pnn-platform.

Visit us at <http://pnn.ethz.ch>

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