Interactive M(obile)-Learning with UbiLearn 0.2[2]

Phillip Maske[3], Patrick Bartels[4] and **Michael H. Breitner[5]**
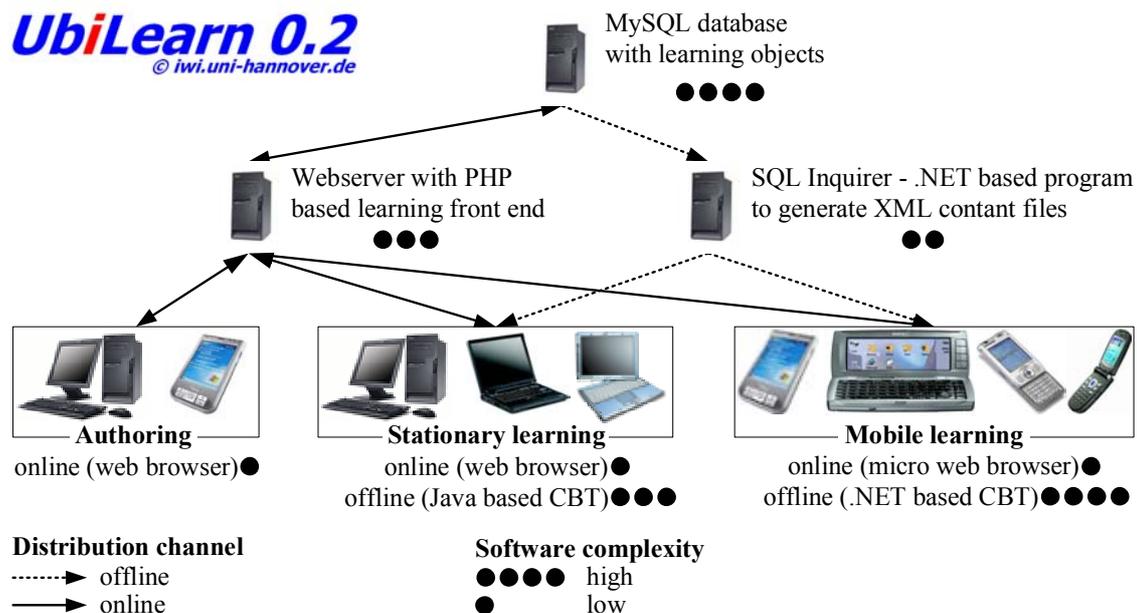
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Abstract: Complex standard e-learning platforms and systems often suffer from inflexibility, an organizational overhead and high total costs of ownership. But customer and software quality orientation require individual solutions for some e-learning demands. This paper considers the design, development, operation and maintenance of an individual e-learning system called UbiLearn (Ubiquitous Learning System). UbiLearn's mobile module is focused. Release 0.2 supports blended learning with different types of exercises and tests, e. g. text based and multiple choice questions. Answers are evaluated automatically. Solutions can be presented as text, figures and slides, audio or video files. Typical learners are undergraduate or graduate students and readers of textbooks. Learners can use different front ends for desktops, laptops, personal digital assistants (PDAs) and Smartphones. Both online web based training (WBT) and offline computer based training (CBT) are implemented. The ubiquity approach of UbiLearn addresses various front ends and everywhere content availability. Reusability – better multi-usability – of software and content is exploited, e. g. in the CBT front ends for desktops/laptops on the one side and PDAs/Smartphones on the other side. Multi-usable content is provided by a uniform MySQL database using standardized learning objects.

1   Standard E-Learning Systems and the Individual E-Learning System UbiLearn

Learning which is supported and/or made possible by the use of information (and communication) technology (IT) is defined as e-learning. IT must not only be auxiliary but has to be obligatorily connected with the learning process [SBH01]. IT suitable for enabling or supporting e-learning is called e learning technology. Important parts of e-learning technology are e-learning applications or front ends, i. e. software applications which are suitable to support or enable e-learning on specific hardware. E-learning systems combine hardware, software and networks where required. E-learning scenarios include e-learning systems and users like learners, instructors, tutors and authors.
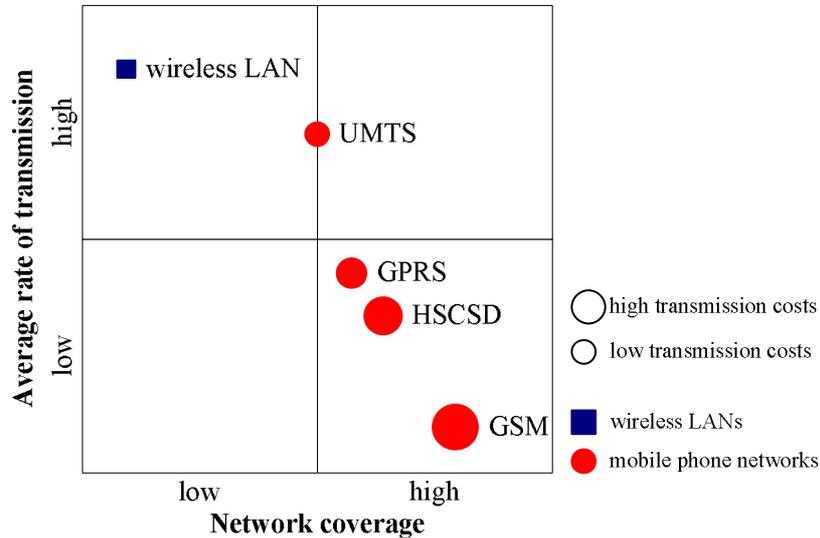
Fig. 7: Classification of mobile Internet connections.

3.4.7   *Security requirements*

There are no special needs concerning the security requirements as no security relevant systems are attached by UbiLearn. Only security aspect that has to be considered is the copyright aspect of used content. Once digital content is created special affords are necessary to avoid the content from being copied without permission. Microsoft .NET does not inherently support an encryption algorithm for mobile runtime environments. For UbiLearn mobile a proprietary encryption algorithm is realized, see [Ma04]. It is adapted to the limited hardware resources of an average target device. The encrypted learning content is completely stored in the handhelds memory, e. g. the RAM memory or a memory card. Loading the content it is decrypted in real time. The encryption process of a complete content file takes less than 1 minute which is the maximum duration a user is willing to accept.

4   Conclusions and Further Research

This paper presents the ubiquitous learning platform UbiLearn. UbiLearn is a flexible and reliable e-learning platform. It accomplishes all major aspects of software quality, i. e. good functionality, high reliability, user friendliness, good performance, easy maintainability and portability. Thereby UbiLearn generates low costs of ownership by using open source and public domain software, database and programming languages. Important feature of the UbiLearn system is

high content reusability as the learning content is stored in standardized learning objects in an independent database. All UbiLearn modules base on the same data base. Learning objects can easily be composed to new lectures. Once a learning object is created it is reused multiple times.

Learning software for stationary learning is at a mature stage of development. Most of them need either installations on a specific computer (CBT) or permanent online access (WBT). This makes learning either dependant from being at a specific place or having an online connection. Key element of ubiquitous learning is to bring learning to motion. UbiLearn mobile enables learning anytime and anywhere. Latest enhancement presented in this paper is the UbiLearn mobile prototype. UbiLearn mobile bases on a Hewlett Packard's iPAQ device family and Microsoft's .NET which enables a maximum number of supported devices within the target group. Here, target group are business administration students in Hannover. UbiLearn mobile makes learning independent from time, place and online connection. All major kinds of learning objects are available on the handheld device, including multimedia attachments like videos or animations. The system is flexible enough to be used in every handheld device with .NET runtime environment. In the near future UbiLearn Mobile will also be available for Windows Mobile for Smartphones.

Currently research at the Institut für Wirtschaftsinformatik concentrates on further development of UbiLearn, especially the mobile module. Currently UbiLearn is a tutorial e-learning system. All major kinds of learning tasks are supported, i. e. text answers, multiple choice questions and clozes. All kinds of tasks support multimedia content in questions and solutions. Mobile devices are continuously further developed. It is conceivable that in the future mobile phones will support speech recognition. The user listens to the questions and answers by speaking without any keyboard or pen. This will increase usability of mobile devices and especially e-learning. Another major goal is synchronization of learning content. A started learning session will be synchronized with the UbiLearn server to be resumed from another device. These affords are complemented by evaluating the usage of e-learning systems, see [BHB04]. The results are directly introduced into UbiLearn. Moreover applications of e-learning systems especially at universities are analyzed, see, e. g. [Ho05].

5   References

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