Web-based learning is one of the important applications of the World Wide Web, which makes possible location- and time-independent learning scenarios. Content can also be kept up-to-date, discussions and interactions between instructors and learners can be supported, new materials can easily be distributed to the students. We will discuss in this talk three aspects of web-based learning materials: web-based learning material repositories, metadata annotation for integrating different resources within such repositories and metadata for adapting these resources to different learner goals and knowledge. Web-based learning material repositories have the potential of providing a set of inter-connected learning materials for a specific area, allowing teachers and learners to use various resources as learning and background materials for specific lectures or projects, and which can be extended by teachers and students with various kinds of materials, including student process portfolios and student projects. Integrating materials in such repositories is a difficult task, and indeed basically all existing repositories have only few interconnections between different materials and modules. We will discuss how appropriate metadata annotations can be used to build up such repositories and what kind of metadata might be appropriate. Finally, adaptation based on learner goals and learner knowledge has been a research topic for quite a few years, and several interesting adaptive systems have been developed. Still, these systems are usually standalone systems, and not extendable by external materials. We will discuss how such adaptive web-based systems and course repositories can be built, again based on explicit annotation and indexing with appropriate metadata.