



EXPANSION AND SUBMISSION OF AN AUTONOMOUS LEARNING SYSTEM FOR ENGINEERING GRAPHICS EDUCATION

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Abstract

Autonomous learning plays a vital role in raising students' learning impact and innovation ability in university education. a good e-learning setting is indispensable in autonomous learning. This paper studies an online based mostly e-learning system ANd examines students' autonomous wit and perceptions of e-learning taking students at University of Jinan in China as an example. during this paper, a web-based e-learning system for engineering graphics course is developed. The characteristics, the planning plan and techniques fit engineering graphics square measure introduced. The design and system composition square measure mentioned. The key technologies and implementation ways of every module of system square measure represented well. the scholars had experiences on the network learning system for 2 years. the sensible application indicates that it will enhance students' sensory activity psychological feature to the teaching contents, increase their learning interests, develop their learning initiative and build them master the teaching contents a lot of quickly.

I. INTRODUCTION

The twenty first century has been AN era of innovations in mass media, info and communication technologies (ICTs) growing therefore quickly, several huge changes are taken place in people's modus vivendi, operating mode, and learning state of affairs. ICTs are changing into {progressively|increasingly|more and a lot of} more widespread throughout the academic field. the normal spoon-feeding teaching mode has already unable to satisfy the stress of the event of recent pedagogy. coaching and up students' autonomous wit is presently changing into a relevant analysis topic. The speedy development of transmission technologies like audio, video, visual aids, multimedia system and therefore the web will increase the potency of the teaching method and permits students to a lot of pronto keep in mind info. Network, a sort of latest info carrier, is that the extension of books and audiovisual media. it's straightforward to be accepted and becomes a lot of and a lot of welcome by school students for its a lot of info capability, multifunction, and better potency [1]. therefore web-based autonomous learning goes to be a vital academic trend. Web-based learning systems build it doable to be told actively and on an individual basis. Therefore, constructing AN autonomous learning setting, additionally as work autonomous learning mode is very important analysis topics in academic field. Engineering graphics, as a vital technical basic course with robust usefulness of engineering students, plays a vital role in engineering discipline, cultivating students' ability in their spatial imagination, manipulation and innovation, and learning sequent specialised courses. particularly in recent years, with the developing of data technology, engineering graphics conjointly enters a replacement age. 3 dimensional style, computer game and network integration technology have modified the concepts of style and drawing. These new technologies add new contents to the traditional subject; what is more, they conjointly raise new needs to its teaching mode. Presently, laptop power-assisted instruction (CAI) has been applied wide in Engineering Graphics teaching and obtained sensible teaching effects. But, there square measure still no enough category hours to guide students to master room teaching content skilfully additionally as apply them. Some students sometimes feel tough in learning this course. Therefore, it's necessary to construct a correct learning setting and improve the students' autonomous ability once category. during this paper, we have a tendency to summarize the results of our previous analysis work [2, 3] and construct a web-based e-learning platform.

II. CONNECTED WORK

The principle of art movement is that students square measure by no suggests that passive receptacles of data. Instead, they're the central focus in learning. Students square measure actively accountable for their own learning, and academics ought to build students construct their own understanding of the course employing a form of ways that. The teacher's role is to guide students to be told by themselves rather than spoonfeeding. The construct of autonomous

learning has been raised for a number of years, and these days become a meaninglessness within the education space. several theorists [4, 5] outline autonomy in many various ways that. however the most plan is that the learner ought to have a lot of of the responsibility for coming up with and organizing their learning, for assessing its worth to his or herself and even for suggesting the mark that the work created ought to get. And academics ought to be info supplier, counselor, administrator, organizer, and so on. a decent learning setting is that the guarantee for college kids to construct their own which means within the method of learning. Nowadays, in university education, internet based mostly e-learning system square measure used for distance tuition, which might produce a complement to teacher-controlled tuition on field [6, 7]. E-learning could be a comparatively new construct implying learning by suggests that of digital media like computers, web pages, video conference systems and CD-ROMs [8]. In recent years laptop programs for elearning, consisting of tools like text, graphics, video, three-dimensional objects and animations, are developed. Virtual school rooms may be wont to broaden academic services[9]. With the event of education technology and therefore the demands of the key, several web-based teaching systems for engineering graphics are developed. however most systems focus to the building of model library or courseware. they typically satisfy to lecture however less fit autonomous learning once category. The analysis on the autonomous learning system for engineering graphics is comparatively rare. Aim at this type of circumstance; we have a tendency to imply AN autonomous learning system during this paper, that provides a perfect autonomy learning setting. the training system includes on-line learning system, on-line testing system, prep system, question and answer system and learning resources library.

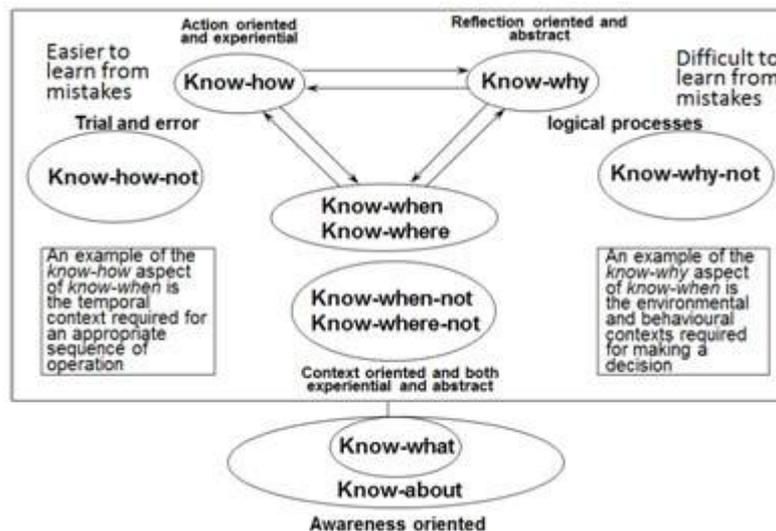


Figure 1. Architecture model of web-based learning system of Engineering Graphics.

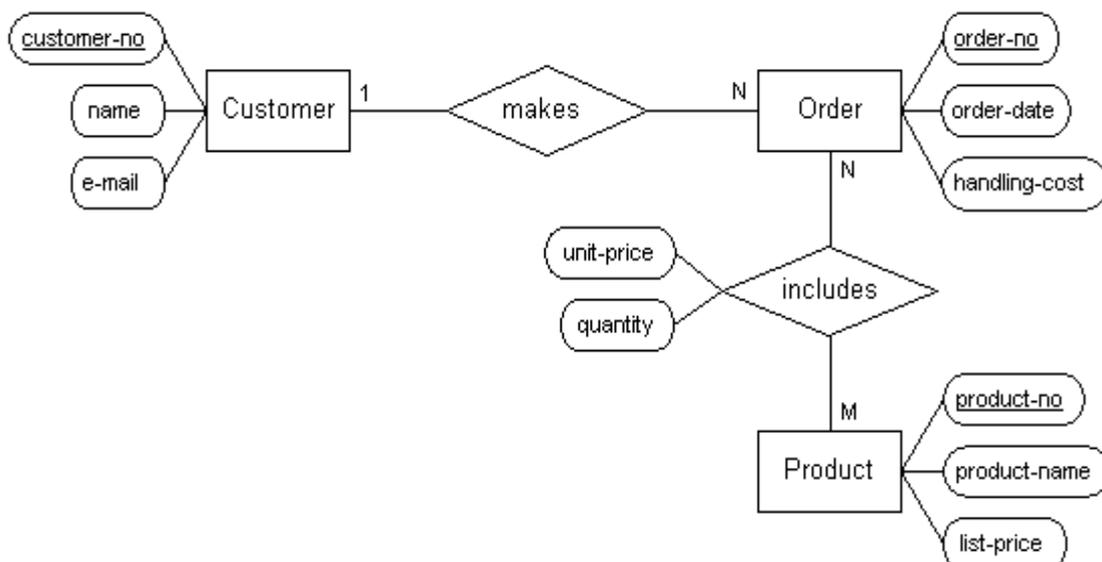


Figure.2. Model of courseware management system.



III. SYSTEM DESIGN AND STYLE

Autonomous learning supported internet ought to be AN organized active and cooperative learning rather than indulgent self-study. that the learning system ought to meet 2 basic needs a minimum of, that's teachers' instruction and students' participation. for instance, academics ought to be able to opt for the courseware in step with teaching content, transfer their own electronic teaching notes, build the courseware on-line or assign and check the prep by learning system.

A. Learning system style In network setting, students will management their own learning progress by themselves, therefore a good computer program is important to the sanctionative of scholars World Health Organization attempt to explore information bestowed within the learning setting and in observance their own learning progress avoid overpoweringly difficult content. Besides, in learning systems, courseware style and management square measure indispensable components. On the one hand, the planning principle of courseware in web-based learning system should be student-centered, and be appropriate to students' autonomous learning once category. On the opposite hand, the amount of varied courseware will increase, the way to realize the courseware or learning materials that square measure best suited or fascinating to students could be a sensible downside. several designers pay way more attention in establishing a learning system however ignore to gauge what material is correct for college kids. Usually, Students World Health Organization study by the network return from completely different specialties, that results in the category hours and contents of finding out engineering graphics square measure completely different. Besides, Everybody's ability features a terribly nice distinction too.

For instance, the system will opt for the contents that students didn't study or didn't perceive mechanically in step with their study records, that the learning contents that the system has designated would be nearest to student's current ability. additionally, the show modes of teaching contents are completely different for various learners. In a word, the adjustable teaching system ought to have follow functions: the can-do ability of teaching contents, the ability of navigation, the ability of show mode, the ability of asking queries and therefore the ability of choosing study strategy.

B. prep System style

The prep once course is extremely necessary for learning the Engineering Graphics lesson due to its robust usefulness. So, academics got to pay an excessive amount of time in correcting students' prep.

Therefore, we have a tendency to style AN intelligence prep system innovatively in our system. The design of prep system is shown in Fig.3, it includes 2 modules: graphic library module and prep correction module. In prep correction system, we have a tendency to apply the speculation and methodology of pattern recognition. a regular answer is taken into account as a guide to match the graphic in prep mechanically by the guide matching rule. Figure.3. Model of courseware management system. The exercises square measure saved within the prep library with ".dwg" format and ".exb" format. Students will use corresponding AutoCAD or CAXA drawing setting to observe on-line whereas click the subject, or transfer the prep to native hard disc to complete them. The finished prep might be uploaded through the prep management system and be evaluated by correction system. once uploading their prep, the scholars will get the correcting results now. the conclusion method of prep management system are going to be represented in another paper.

C. **Intelligent respondent** System style Being the continuation of room teaching, the communication among academics and students is a vital side in teaching activities. Network makes the communication simpler and convenient. There square measure several communication vogue on web, like whiteboard, video meeting , BBS, journal , E-mail, MSN/ICQ and general text chat. Among them, BBS is a very in style type of communication for teaching and students and has been utilized in varied teaching systems wide. Once logged in, academics or students will perform functions like uploading and downloading software package and knowledge, reading information, and exchanging messages with alternative users. Using BBS, academics will participate in discussion, answer queries or instruct students to debate a definite topic [4, 5]. we have a tendency to conjointly style a BBS-based respondent platform in our learning system, however completely different from ancient BBS, our respondent system has intelligent characteristics.

D. **Management System** style Teaching and a resources library each plays a vital role within the network teaching system. A completed teaching resources library is that the basic guarantee for the learner to check with efficiency. it's created from 2 parts: CAI software package library and study resources library. The CAI software package library includes varied domestic or international wonderful coursewares that square measure collected by all kinds of avenues, which can be an entire course, conjointly doubtless to be an area lesson or a information keystone. The CAI software



package within the library ought to have numerous kind and luxuriant contents to suit the stress {of completely different|of various} courses or different level. The study resources library provides luxuriant study background materials, further materials and alternative multi-media materials. For the engineering graphics, 3D solid models, engineering drawings and cartoons ought to be main recourses in its teaching recourses library. Facing such a big amount of teaching resources, the way to collect, manage, index and build use of them ought to be targeted within the method of building network courses. In our autonomous learning system, we have a tendency to style a management module to support every a part of the webbased system, together with register, student's standing management, skilled information management, the info datum and analysis, info search, document management and system setup or maintenance. as a result of there square measure too several modules and teaching resources within the learning system, we have a tendency to style the info for every module severally. Then, once one in every of the modules must be enlarged or updated, the others may work unremarkably.

IV. THE KEY IMPLEMENTATION TECHNOLOGIS

At present, several network development tools are used, every quite tools has its own blessings. Considering the teaching resources library of engineering graphics is massive in amount and varied stylish, we have a tendency to adopted 3 layers B/S structure because the network structure, used PHP+ Apache+ MySQL because the main technology to develop the management system.

A. regarding the B/S Structure The Browser/Server (B/S) structure is employed in developing the system rather than ancient Client/Server(C/S) mode as a result of that the network learning system is AN open system, and therefore the resources info must be enlarged and updated ceaselessly. however the shopper in C/S system should be put in varied corresponding applications to a definite system. it's a "fatty" shopper and may not meet the necessity of the data economic process and therefore the client permutations. completely different from it, on the shopper of the B/S structure, users solely must install browser rather than the other procedure. it's a sort of "thin" shopper system, that all applications and knowledge info of the system square measure saved on the server. Users flick thru the websites on their browsers, which all calculation operation and calculation process square measure completed by applications on the server.

B. PHP+ Apache+ MySQL Technology the rationale that we have a tendency to choose PHP+Apache+MySQL because the developing technology is that PHP+Apache+MySQL square measure thought to be the simplest combination technology to develop dynamic websites currently. MySQL will mix with PHP seamlessly; and Apache internet server [6] is one in every of the foremost in style internet servers on the net at this time, it's high-efficient, reliable, straightforward to expand, powerful, and every one supply codes square measure free. the mixture of those 3 technologies is very appropriate for tiny and medium enterprises and academic establishments, it's low to pay, however there's higher performance.

b. Developing principle and implementation of standard PHP program The PHP files equivalent to every operate standard square measure composed of the many components. If every half in a very PHP file is saved as a private standard, then the complete file may be thought to be a mix of those freelance standard. In system implementation, we have a tendency to conclude four sorts of system standard in step with its nature and performance. they're signed by file extension name. Among them, ".mod" file is that the guide file of HTML that wont to construct the page. ".inc" file is to show a definite page. ".form" file is to show text in a very bound page. ".php" file could be a PHP program file to implement the operate integration of alternative standard. This standard PHP developing methodology makes code structure clear and straightforward to style and maintain. additionally, some code perhaps be used again and again in varied standard, victimization the standard PHP developing methodology will share these code in several standard.

V. APPLICATION OF THE E-LEARNING SYSTEM

The system mentioned during this paper is a perfect setting for college kids to be told on their own terms. victimization the system, we have a tendency to studied the autoumous learning within the course of engineering graphics for the scholars of applied science.

A. Teaching experiment and arrangement 5 categories with 2000 applied science major school students registered within the year of 2008. Teaching experiment, interview, form, observation and examination square measure used for knowledge assortment during this study.



Teachers still play vital role in cultivating students' learning autonomy ability. they typically guide students to the proper means within the method of learning. So, as academics, they must teach students the way to learn rather than learning itself, introduce the requirement and feasibility of autonomous learning additionally as facilitate them to be autonomous learners within the finish. For the experimental students, a replacement transmission teaching mode is introduced, that is characterised as web-based autonomous learning. For the opposite students, a standard transmission teaching mode remains adopted.

B. scientific method

In new teaching mode, a lot of attention is paid to cultivate the students' autonomous learning. 2 stages were adopted within the experiment. the primary stage is teacher-instructed autonomous learning. throughout this era, one hour's in-class amount is allotted to show the most information points. The teacher dominates the complete category and facilitate students grasp the essential theory and methodology. within the amount of subsequent 1/2 AN hour, the teacher arranges some contents for college kids to be told autonomously in e-learning setting. Students apply varied resources within the learning system to complete the allotted tasks on an individual basis and severally. whereas students study, the teacher ought to go around ensuring that each student is concentrating on their studies. which will facilitate teacher to urge the overall info regarding students' learning. Besides in-class amount autonomous learning, a definite times autonomous learning once category are offered to the scholars. Students will fulfill their studies by victimization courseware and alternative teaching resources within the e-learning system, end their assignments on-line and consult the feedbacks from their teacher. during this means, their learning may be adjusted consequently. during this primary stage, the teacher tries his best to assist students master the abilities of autonomous learning, organize their learning by the e-learning system, and so, improve students' learning interests. The second stage is non-instruction autonomous learning. once the first-stage coaching, students had down pat some autonomous learning skills. In class, with their teacher's facilitate, students will style their learning plans; choose specific learning tasks, regulate their learning so improve the potency of autonomous learning. once category, students square measure absolute to study on-line. they'll opt for completely different learning materials supported their interests and their capacities. once they meet queries, they'll build contact with their teacher through E-mail or BBS whenever they need. in step with the assessment from the teacher, some measurements are going to be taken to reinforce their learning. during this means, students' intrinsic motivation is inspired; as a result, they become inquisitive about learning and communicate with others.

VI. CONCLUSIONS

The work bestowed during this paper describes a posh autonomous learning system of Engineering Graphics and its application. The observe on the system has been administrated for 2 years and thousands of scholars participated in it over this era of your time. 2 years teaching observe shows that the strategy of learning was appreciated by the scholars World Health Organization worked onerous. it's not solely able to save teaching time and enhance teaching quality and potency, however conjointly stimulate students' learning interests, develop their learning initiative. any a lot of, the development of autonomous wit, has necessary significance to enhance students' innovation ability, train their cooperative consciousness and lift the power of analyzing and determination issues severally. Now, students have accepted the teaching system extensively. The teaching observe conjointly evidenced that we will use info and transmission technologies to supplement classical learning with sensible learning results and to produce a pleasing learning expertise for the scholars. As AN e-learning system, the intelligence of system is a vital property. Intelligent looking out and resources recommendation system, which might advocate learning resources best reflective verity interests of various learners, is our future analysis direction.

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