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DEVELOPING STUDENTS' COMPETENCIES IN THE DESIGN OF BUILDINGS AND STRUCTURES BASED ON THE INTEGRATION OF BIM TECHNOLOGIES INTO THE GRAPHIC EDUCATION PROCESS

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Annotatsiya

Maqolada zamonaviy kompyuter dasturlari orqali dars jarayonlarini tashkil etish. Kurs loyihasi va amaliy mashg'ulotlarni bajarishda BIM texnologiyalariga asoslangan revit dasturini samarador jihatlari ko'rsatib o'tilgan bo'lib, talablarning amaliy kompetensiyasini rivojlantirishda zamonaviy kompyuter texnologiyalari qanday ahamiyat ega ekanligi borasida so'z boradi.

Kalit so'zlar

ta'lim, texnologiya, kompetensiya, model, axborot,amaliy mashg'ulot.

Аннотация

В статье организуется учебный процесс с помощью современных компьютерных программ. В курсовом проекте и практических занятиях показаны эффективные аспекты программы Revit на основе BIM-технологий, а также обсуждается значение современных компьютерных технологий в развитии практических требований компетентности.

Ключевые слова

образование, технология, компетентность, модель, информация, практика

Abstract

The article organizes the educational process with the help of modern computer programs. The course project and practical classes demonstrate the effective aspects of the Revit program based on BIM technologies, and also discusses the importance of modern computer technologies in the development of practical requirements of competence.

Key words

education, technology, competence, model, information, practice.

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INTRODUCTION

Uzbekistan Republic Presidential Decree №PF-5847 of October 8, 2019 education system by 2030 develop concept (next in places - Conception) higher education system social industry and economy networks from needs come came out without, science, education and working of release solid integration provision based on education quality improve, competitive personnel preparation, scientific and innovative activity effective organization international cooperation develop for the purpose of, as well as Uzbekistan Republic Presidential Decree №PQ-4391 of July 11, 2019 « Higher and middle special education to the system management new principles current to grow measures "about" performance on the surface working published [1].

Including, Uzbekistan Republic President's 2018 September 5th In 2018–2021, Uzbekistan Republic people education system further improvement according to Resolution №PQ -3931 "On the Program of Measures" education quality improve and innovative education technologies current to grow task It is marked. according to advanced world to experience relying on new state education standards and general middle education study programs step by step current to grow and improvement intended [2,3].

Current on the day modern computer from technologies used without lesson processes organization to grow through mastery indicator our increase possible.

REFERENCES ANALYSIS AND METHODOLOGY

Construction sciences computer from technologies using teaching according to many scientific research take including Construction sciences Using BIM technologies in education use (AI Abdurakhmanov [6]), digital technologies using construction sciences of teaching didactic foundations (BR Rustamov [7]), construction sciences in teaching cross-platform mobile from applications use (NB Ergashev [8]), construction sciences in teaching cloudy from technologies use (NK Kholmatov [9]), Construction virtual reality in education (AA Jumaniyozov [10]), BIM technologies construction in education application opportunities (NB Sayfullayev [11]), construction using BIM technologies in their projects use (AR Abdullayev [12]), digital technologies based on construction design (BX Khojiyev [13]), construction virtual reality in education use (MI Alimov [14]), construction sciences in teaching mobile from applications use (NB Ergashev [15]), Above cited scientific affairs analysis as out as a result visible as it stands, the computer technologies used without education quality efficiency increase according to research works take This cited in the works students practical competence develop problems research not yet arrived.

Yu. M. Zubareva , AE Malankhanova, CMKomarova, MD Kitaygorodsky, EVTolmacheva, A.D.Arnautov such as foreign of scientists scientific in their research education in the processes computer your technologies of use efficiency showing passed.

The world developed in countries computer graphics teaching to the effectiveness was attention computer technologies development and globalization important changes input, advanced technologies development by designating in giving of importance come out further increasing Today's on the day of the world advanced in institutes computer technologies through lesson processes various kind visualization, various effects with work and lesson processes organization to do important importance profession is doing.

World on a scale computer graphics education in the field "Animation oath graphics", such as "Construction of 3D modeling" and "Design of graphics". innovative approaches application, method of science supply improvement, in student's spatial graphic imagination develop and design qualification of formation visual methods to practice wide implementation to grow in the directions effective scientific research take is underway [4].

Students practical competence in development AutoCAD software and BIM technologies importance important is considered.

RESULTS

Last ten in years technologies design and construction process fundamentally changing sent. So revolutionary from technologies one **BIM** system (Building Information Modeling) — that is buildings information modeling technology. Architects and designers for this simple tool not, maybe work process oneself changing new This is standard. In the article we will discuss what BIM is. that it is, that it how performance and why are they experts for important step that in detail explaining Traditional design methods usually 2D drawings and separate 3D visualizations to create own inside but this approaches often to difficulties face comes: drawings outdated to remain, different teams various of files versions with performance possible and this and construction on the playground mistakes and to delays take is coming.

And BIM completely different approach offer It is the only information model creates, then of the building all elements each other with depends. If you model any one element If you change it, all relevant drawings, specifications and calculations automatic in a way It is not only updated design process accelerates, but mistakes also reduces the likelihood.

BIM - this English abbreviation Building Information Modeling, that is, of buildings information models is to create. Prepared project three dimensional in

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space It is only in classic 3D modeling happened like , draw lines and from textures consists of just not, maybe in the project there is construction and of elements physicist, mechanic to the characteristics has was various similar artificial from elements BIM technologies based software of supply in practice wide application for reason happening factors see we will go out : 3D visualization. Such in case you on the screen three dimensional in detail still not built of the building appearance in advance see opportunity and construction model create This is possible. function using you the project presented if you do, it visual in a way your assessment, on a 3D printer real You can print the layout, as well as design process and construction your observation and changes or settings done your increase possible. Grouped information save. To the designer known was all information one in the program, of drawings one in the collection there is It will be. parameter if you change, changes automatic accordingly other to the elements related without changes. Design in the process construction and of elements to each other dependency because of in the project to the surface coming errors maximum at the level decreases. Data base complex management. Usually, a master plan of drawings separately project solutions available. BIM technologies-based software in supply done of projects all information one in the program, one in the file your concentration possible.

Revit software - Autodesk company by created program to be, to design in the field wide opportunities for, two measurable and three-dimensional element and constructions modeling for many to users has become is coming.

Buildings information modeling platform Revit software - construction project for necessary was constructive project, drawings and specifications own inside received construction project documents to prepare the building is designed information model designed of the object constructive dimensions, project stages and quantitative indicators shows. In the Revit model every one drawn sheet, two dimensional or three-dimensional appearance and specifications presented the only information that is provided from the base taken from data used in Revit. drawings and in specifications of the building project about information of the project all other stages with coordinated. Revit change parametric coordinator internal system of the project every how structural in parts, for example, model types, drawn sheets, specifications, cutting types and planned types such as changes automatic accordingly coordination opportunity gives.

Buildings energy economical engineering in the field of communications tasks to BIM technologies through the Revit software based to perform through student's construction in the process happening situations complete imagination they do and understand accelerates. This program AutoCAD from the program different

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accordingly ready template with to the possibility has in the template construction in the stream everyone equipment elements there is.

This function through student to oneself necessary was the device quickly find and use possible is considered . In this we are choosing our equipment realistic in the state to the part passing complete to the imagination has let's be possible. As we can see in Figure 3 possible hot water for red cold water for blue in color pipe from the drawing used from AutoCAD project to perform during student performing work complete understanding opportunity complicated counted because the project completely understands for 2D done the project otherwise 3D appearance having done exit and, on the highway, ready from the template use opportunity limited for more It takes time.

In Figure 1, the pipe being deployed management crane equipment on the panel management crane diameter given above in pictures diameter small was to the pipe to him/her relatively bigger was management crane placed see It is possible. equipment to install through student's construction environment their understanding in relief diameter small was to the pipe diameter big was the device I am sorry. if program automatic accordingly refusal will reach.

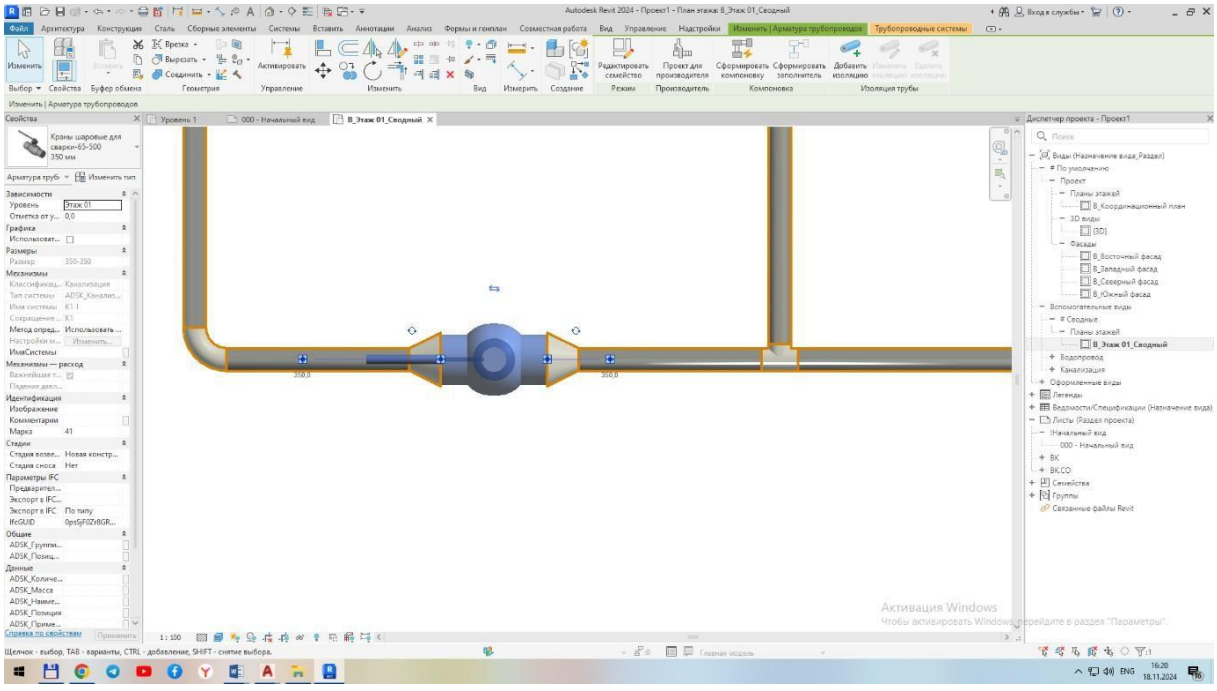

Figure 1.

In this opportunity AutoCAD in the program there is absence because of currently existing science assignments Revit to the program adaptation to the goal appropriate is considered.

3D view of the building our view possible in the room every one window and the doors are also in the room climate to the parameters big impact shows and every one parameter into account received in a way account their work take Let's

go. Students every room required for heat amount in determining external to the surface correct arrived windows and doors are also taken into account take account their work done increases need will be that's why in Revit for communication part designing student complete to the concept and practical knowledge develop to the possibility has will be.

Heating equipment installation shown student placing equipment how at altitude where to being installed complete realizing to perform opportunity has will be AutoCAD in the program to perform during the device where to how installation complete determination opportunity absence because of Revit from the program use to the goal appropriate is considered. If you give being installed pipes to each other chaos not giving consideration taken so assignments to perform through students theoretical and practical knowledge our union possible. Above cited from thoughts this our understanding maybe students practical competence in BIM technologies in development use to the goal appropriate "Buildings" energy economical engineering in the field of "communication policies" tasks to BIM technologies based from programs using to perform methodology working exit today's day current from issues one is considered.

Architects and designers BIM system for main Advantages:

Visualization and details improvement.

BIM system using projects three measurable in the environment high detail level with Architects not only object how appearance their views maybe, maybe his/her elements each other with how mutual in touch to be also evaluations It is possible. especially internal space designers for important because they materials and of colors in space mutual the impact in advance see to the possibility has they will be.

Changes effective management.

Traditional in design every how small change many drawings and in documents changes to enter demand BIM system the model in change all information automatic in a way updates, this and work the load noticeable at the level reduces and mistake to do the risk minimizes.

Collective the work support

BIM all in the project participation those who are doing it — architects, designers, engineers, contractors and customers on a single platform unites. All one with the same model it works, this information exchange simplifies and decisions agreement process accelerates.

Analysis and optimization.

BIM system design in the phase various analyses to transfer opportunity gives: of the building energy efficiency from evaluation estimate value calculation and of

the object vital cycle This is optimal and stable projects to create help gives.

Time and the money saving.

BIM system mistakes minimize and the project initial in stages optimization opportunity to give because of design and construction time noticeable at the level reduces costs and reduces.

BIM system software from supplies to use based on, for example, Autodesk Revit, ArchiCAD, Bentley Systems and others. This programs three size buildings models create and every one construction element about information add opportunity but the most the main thing is this simple " drawing" is not a tool. BIM is complete information base is the building vital cycle during all information saves: design and from construction exploitation and even break until the process.

Architect BIM system with while working not only creates a visual model, but to oneself typical to the features has was the object For example, in a BIM model wall materials, thickness, sound insulation and other parameters about information own inside This information engineers by download in computing , designers by decoration materials when choosing and builders by materials buy in receiving is used.

Interior designers BIM is new for opportunities opens. Using BIM internal spaces all small details with, including furniture, lighting, materials and equipment to model with possible. This space how performance, various elements how each other impact to do and design how acceptance to be done in advance assessment opportunity gives.

From this In addition, the BIM system customer with agreement process simplifies , because visual models further more precisely and to the customer the result better understanding opportunity BIM system through designers further clear and thorough working issued solutions offer they do it is possible, this and customers trust increases.

CONCLUSION

Conclusion as to say maybe progress side speed step by step going in our country young to the generation knowledge to give, their knowledge level international assessment to the standards equalizes for teachers on behalf of big responsibility Loading. This is from teachers further educated, sought-after and to education related the most last from the news aware to be demand Modern computer from technologies used without lesson processes organization to grow from them lesson in the process effective use important importance profession Above cited from data this determination maybe lesson from Revit program in the process used without students practical competence increase possible that's it remaining to programs than much efficiency high is considered.

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