



Introducing the Innovative Course of Architecture Modeling and Rendering (R.S.V.P)

Maziar Sardari¹, Sirous Bavar²

1. Master of Architecture, Islamic Azad University, Saveh Science and Research Branch, Saveh, Iran

2. Professor of Islamic Azad University, Saveh Science and Research Branch

Original Article:

Received 10 Oct. 2017 Accepted 15 Nov. 2017 Published 08 Dec. 2017

ABSTRACT

Nowadays, software and three-dimensional (3D) modeling play a vital role in architecture. It can be truly stated that sketch is the first and fastest way to express opinions and ideas for design; however, the final output of any idea and concept in current world should be presented as a three-dimensional output in order to reveal more details and effect on audience because of its visual beauty. In our dear country, Iran, all of employers, referees, architects, academic professors, etc. except nothing form final output unless a beautiful and high-quality 3D. On the other hand, graduated architects should be able to work with architectural 3D software if they want to be employed in private and governmental design companies.

This study was conducted to introduce a new method for 3D architectural design for the first time using applied-developmental method, a method that provides the most suitable output within short time merging simple and understandable commands of four programs (software). The final output of this method was confirmed by employers of architecture in terms of occupation, also by referees of architecture competitions and academic professors in terms of education.

Keyword:

Software, Three-Dimensional (3D), Architecture, Occupational, Educational

* Corresponding author: Sardari

Peer review under responsibility of **UCT Journal of Research in Science, Engineering and Technology**

1. Introduction

Unfortunately, many people in Iran think that “3Dmax” is the only software used in architectural companies and approved in architecture competitions so that it is useless to learn other software. Some reasons such as difficulty, long time, and high cost to learn Max Software as well as time-consuming aspect of 3D design of a project through this software have prevent students and many of graduated students in architecture from learning software that is an essential element in architecture. In this case, newly graduates have to pay money to technical offices and face many problems in job and employment market.

The compressed course of R.S.V.P- that is formed from the initial letter of the name of each program- is a course that its final output is obtained from merging following software:

Revit + Sketchup + v-ray + Photoshop.

Some advantages of this course can be mentioned as follows:

- Final output of this method obtained from work through 4 architecture software is more qualified that the output of 3D software of AutoCAD, Revit, ArchiCAD, and Sketchup. In this method, can work with all of difficult and complicated domestic and foreign models learning complete modeling (basic and advanced) through Revit and Sketchup software.
- Compared with “3DMax”, it cannot be stated that final output is as good as the output of max since this is the best rendering software in the world so that it is hard to distinguish its render from reality picture; however, the introduced software can be ranked as second software after max regarding rendering.
- In terms of time, the compressed course takes less time to implement a project compared to 3DMax. For instance, design of a villa may takes 2.5 to 3 days through 3DMax Software, while such design can be done within one day through compressed software. Hence, the introduced course is suitable occupationally since the design is prepared within short time with high quality.
- The most significant advantage of this method is its validity confirmed by employers, architecture competitions, and architecture professors.

One of the most important capabilities of R.S.V.P method is that the final three-dimensional format of project file can be simply entered to LUMION Software so that the work can be presented more beautifully proving an animation of project architecture.

This paper provided a summary of method of this course [1].

REVIT

Revit is modeling software for construction data that is used by architects and engineers of construction and installations regarding 3D modeling and illustration of constructive details.

This program enables users to make three-dimensional design of building, structure, and its components, to mark using two-dimensional elements, and to access construction data from building model database. Simultaneous two-dimensional and three-dimensional design is one of underlying features of Revit [1].

Other specifications of this software can be mentioned as follows:

- Simplicity and learning speed
- Increase speed and accuracy of illustration and changing maps
- Rapid conversion of phase 1 maps to phase 2 maps
- Simultaneous relation between architecture maps, structure maps, and installation as well as simultaneous changes in these maps
- Removal of adaptation errors in facades, plans, and sections
- Climate studies (light and shade) on the building
- Definition of construction standards for building equipment
- Calculation of building quantity and rapid change in it in case of changing maps
- The ability to communicate with other software contributing volumetric design and converting it to executable maps [2]

Revit was used as modeling software in this innovative course eliminating its rendering and lightening capabilities. Some possibilities of 3D modeling in Revit are revealed in this course so that nobody expects to see such designs produced by this software, because all of training centers for architecture software in Iran teach Revit as software for 3D modeling of plan without mentioning its professional modeling [3].

Following figures indicated modeling ability of Revit:



Figure 1: Creation of filled and empty spaces on the wall and ceiling (The Author)



Figure 2: Creation of half-galls walls (The Author)



Figure 3: Creation of any kind of curved roof (The Author)



Figure 4: Creation of arched walls from the side (The Author)



Figure 5: Creation of any kind of stairs ordered by the employer (The Author)

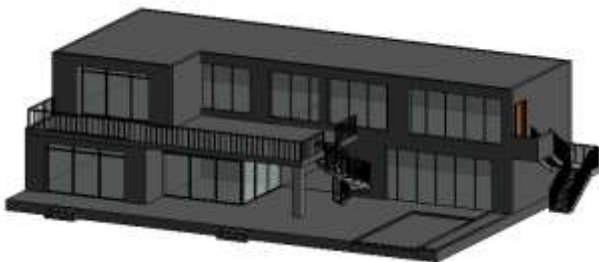


Figure 6: Creation of any kind of internal and external design (3D view of a villa through Revit) (The Author)

SKETCHUP
Sketchup is one of simple and efficient software for 3D modeling in architecture.

This software is used for civil engineering, mechanical engineering, and design of computer games. The models of this program are produced connecting lines to each other as model edges. In case of connection between three or more edges to each other, a plan is created so that model view is created automatically. The mentioned edges and created view produce a 3D model [4].

Sketchup is used in compressed course of architecture modeling and rendering (R.S.V.P) to complete advanced modeling and 3D modeling. It is simple to work with this software because of its low accuracy so that students can find the application of each command by seeing its figure and design simply. Some forms such as different kinds of dome,

church bells, and elements with circled plans that their size changes when moving through vertical axis can be simply drawn; the mentioned forms were hardly drawn through Revit. In this method, 90-95% of a project in Revit can be 3D modeled and the rest of the project can be completed entering the output to Sketchup and performing considered operations (if the domed forms are used in project) [3].



Figure 7: Design of forms with vertically variable circled plan diameter such as bell (The Author)

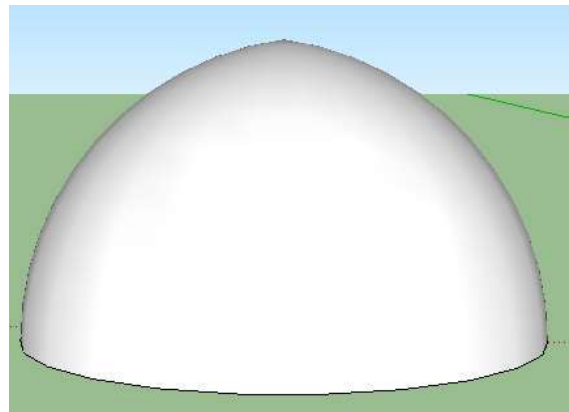


Figure 8: Drawing domed forms through SKETCHUP (The Author)

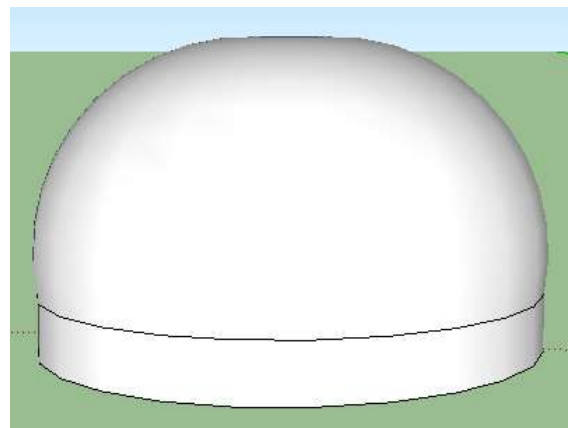


Figure 9: Drawing domed forms through SKETCHUP (The Author)



Figure 10: Entering the villa into SKETCHUP (The Author)

(V-Ray)

V-Ray is a mostly used plugin. This software was first used only for architectural projects, but now is using in all fields of cinema, advertisement, car industry, computer games, and presenting manufactured products, etc. [5].

V-Ray can be attached to different software such as 3DSMax, Modo, Katana, Nuke, Rhino, Maya, SKETCHUP, Soft Image, Autodesk, and Revit making it possible for user to draw natural lightening, super-real materialization, access to real full-option camera, and the most important option that is access to a high-speed and unique render engine to obtain output from 3D projects drawn through the mentioned software [6].

The important operation of materialization or drawing the initial design are done in R.S.V.P course using V-Ray plugin; in this case, all materials are prepared with their specifications such as roughness, softness, glossiness, transparency.



Figure 11: Project materialization through V-Ray (The Author)

At end step in V-ray, the project will be rendered selecting a suitable camera view. (It should be noted that V-Ray is used in compressed course just for materialization and rendering and all of other adjustments such as concentration of lights and shades, resolution of materials, etc. are done through Photoshop) [3].



**Figure 12: Rendering through V-Ray (The Author)
Photoshop Architecture (POST PRODUCTION)**

This software is a graphic processor. Photoshop was developed by Adobe Company and used to create, combine, edit, recreate, or change pictures and figures. Photoshop is

used for Windows and Mac OS (Macintosh Operating System). In addition, all versions of this software (to 10th version) can be used in Linux operating system installing assistant tools. In fact, Photoshop was born in Michigan State of America [7]. Glenn Knoll was a university professor interested in photography and had a private darkroom in his house. Private computers (PCs) were invented at that time and Glenn was interested in this invention. Children of Glenn had a creative mind like their father so that they could create a fantastic future for themselves using a PC and darkroom.

Thomas, one of children of Glenn, was highly interested in photography and photo editing and stated, "photography was one of my hobbies during high school. I learned to develop black and white or colored pictures as well as play with contrast and color balancing in private darkroom of my father". John- brother of Thomas- was working with computer programming through Mac OS using Apple II plus device that their father had bought.

Besides photography, Thomas was interested in programming and bought an Apple Macintosh Plus to edit pictures of his dissertation, but Apple Macintosh Plus could not display gray surfaces of images. Thomas needed such feature and started to write several programs to make this feature possible.

Thomas' brother, John, got excited when saw his programs and suggested him to integrate and develop programs. Thomas named his software collection as Display. John also presented some ideas to save picture in different formats of bright and dark then they programmed these ideas during several months. They invented the software entitled Image Pro in 1988 and after completing it, John recommended program commercialization. John was marketing agent of Silicon Valley Company at that time. Many of companies became interested in their program. Of them, Barney Scan Company was more eager. Finally, John and Thomas signed a contract with Barney Scan Company to sell this software named Photoshop besides scanners of this company. John presented a preview of software in Adobe Company in 1988 and this action led to Photoshop presentation by Adobe. In previous versions, this software was installed along with other software named Adobe Image Ready focusing on image preparation on the web. Accurate adjustment of format, quality, and compressibility of images and animations as gifts were features of this program. Majority of features of this program were merged with Photoshop after purchasing Micro-media Company by Adobe and adding fireworks program of Adobe software packages. Although Photoshop was first designed to edit images in order to be printed on paper, Photoshop is increasingly used to produce and edit digital images because of various options given to user. There is also a strong connection between Photoshop and other software of Adobe Company to edit and generate animation and CDs [8]. Files can be exported to other software such as Adobe Image Ready, Adobe Illustrator, Adobe Primer, Adobe after Effects and Adobe Encore DVD as specific format of Photoshop PSD or they can be entered into Photoshop. For instance, Photoshop CS supports menu and some bottoms for DVD. Graphically, Photoshop Software can work through several colored samples such as rjb, lab, cmyk, black and white examples [9].

The most important part of innovative course of architecture modeling and rendering (R.S.V.P) is post-production operations in which, the beauty and elegance of work in actualized so that the errors related to previous modeling and rendering can be edited. Drawing sunlight, shadows, surrounding landscapes, materials clarity, reflexology of glasses, water transparency, urban and residential furniture as well as all operations leading to final rendering can be done at this part. It is also possible to perform lightening through Photoshop to strengthen beauty of final output. In this way, the difficult adjustment that ought to be done step-by-step through V-Ray in which, adjustment were continuously coded and render tested (concentration of lights, shadows, material damage, landscaping, reflexes, etc.) can now simply done within a short time [3].



Figure 13: Final output of course (The Author)

More Completed Examples of Final Outputs of Course



Figure 14: Selected design of Dam Sailing Club in Saveh Province (The Author)



Figure 15: Head design of Tehran Technology Park (The Author)



Figure 16: Selected head design of Tehran Technology Park (The Author)

Conclusion

It cannot be denied that all of architecture and 3D modeling software have some defects; hence, working with all architectural software should be learnt in order to complete a complicated project. However, such difficult action that requires high cost and time may lead to fed up with software, reduced efficiency and quality of design; finally, designer may become disappointed. In innovative course of architecture modeling and rendering, shortcoming of a program is covered by the strength of another program. In this case, if it is difficult to work with some commands in software, the project will be transferred to another program to use similar commands in a simpler way.

The compressed course prevents form teaching useless commands for an architect through software and this option saves time just concentrating on teaching a high-quality design. The experience of teaching this course has indicated that this course can be learnt during 24 hours while other architecture programs are taught in architecture center within 30-140 hours. It is hoped that this course is taught inclusively so that those architects that have been newly entered to design market can sign private and public contracts within a short time using the output obtained from this course.

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