UDC 7.01:7.03:7.04
DOI https://doi.org/10.24919/2308-4863/78-2-16

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ARTIST'S REFLECTION ON SCULPTING USING VR AND OTHER TECHNIQUES

The article analyzes the suitability of VR tools for sculpting through comparison with techniques similar in spirit but different in actual implementation. Sculpting, until recently, was to be done in one of two ways: digital 3D modeling or working with clay, stone or metal. Emergence of software for modeling in VR brought a third alternative into the mix, with it being a half-way solution, theoretically capable of merging beneficial aspects of previous two ways. However, evidently, it is not as widely used in the artistic world, as it could have been. When discussing any new software, particularly one made for use as an art tool, it is important to talk not only about its features and use cases, both real and potential, but also touch upon the feature parity with existing alternatives. It is, therefore, needed to include the end user's perspective into our assessment, since artists are the ones who will be the core audience of such software products. For the purpose of this article, comparison is made between freely available techniques and software (as it will likely be the first point of contact with the respective methods of artwork creation), which is similar in the principles and/or has necessary functionality that can mirror other options it is to be compared against. We will also look at the issue of adoption of new (VR) techniques versus keeping hold of old (clay, Blender, etc) from several perspectives such as: necessary up-front investment, space usage efficiency, graphical fidelity and granularity of control over shape and form, perception of art made using this tool or technique and lastly we also mention some ways all three could be used in tandem to achieve better results. All of the above is presented in a form of personal assessment from the user's point of view, based on previous experience, with the goal of approximating what, how and why would be preferred by sculptors, modelers or any other artistic profession.

Key words: *VR sculpture, 3D modeling, sculpture, VR, virtual reality.*

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РОЗДУМИ ХУДОЖНИКА ПРО ЛІПЛЕННЯ З ВИКОРИСТАННЯМ ВІРТУАЛЬНОЇ РЕАЛЬНОСТІ ТА ІНШИХ ТЕХНІК

У статті проаналізовано придатність засобів віртуальної реальності для створення скульптур через порівняння з близькими за духом, але різними за реалізацією техніками. Донедавна скульптуру можна було створити одним із двох способів: цифрове 3D-моделювання або працюючи з глиною, каменем чи металом. З появою програм для моделювання у віртуальній реальності з'явилася третя альтернатива, причому це було компромісне рішення, теоретично здатне об'єднати позитивні сторони двох попередніх способів. Однак, вочевидь, у мистецькому світі воно не набуло такого широкого застосування, якого могло б досягти. Обговорюючи будь-яке нове програмне забезпечення, особливо те, що призначене для використання в якості художнього інструменту, важливо говорити не лише про його можливості та варіанти використання, як реальні, так і потенційні, але й торкнутися питання паритету можливостей з існуючими альтернативами. Тому необхідно включити в нашу оцінку перспективу користувача, оскільки саме художники будуть основною аудиторією таких програмних продуктів. У рамках цієї статті порівнюється вільно доступні техніки та програмне забезпечення (оскільки вони, ймовірно, будуть першою точкою контакту з відповідними методами створення творів мистецтва), яке схоже за принципами та/або має необхідний функціонал, що може віддзеркалювати інші варіанти, з якими ми порівнюємо. Ми також розглянемо питання впровадження нових (VR) технік у порівнянні зі старими (глина, блендер тощо) з кількох точок зору, зокрема: необхідні початкові інвестиції, ефективність використання простору, графічна точність і деталізація контролю над формою та об'ємом, сприйняття роботи, виконаної за допомогою цього інструменту чи техніки, і, нарешті, ми також згадаємо деякі способи використання всіх трьох технік у тандемі для досягнення кращого результату. Все вищесказане представлено у формі власної, особистої оцінки з точки зору користувача, заснованої на попередньому досвіді, а не на статистичному аналізі, з метою наближення до розуміння того, що, як і чому було б обрано скульптором, модельєром або представником будь-якої іншої мистецької професії.

Ключові слова: *VR скульптура, 3D-моделювання, скульптура, VR, віртуальна реальність.*

Introduction. Sculpture is one of the most interactive and interesting art forms to work with and to experience as a viewer. Digitally created works can combine attractiveness of the three-dimensional object, with the permissiveness of modern techniques. Still, if sculpting with clay or marble is well-understood, due to the extreme age of these techniques, digital tools have to "play catch-up" with real-world counterparts. Adding to this, VR tools, that could become a bridge between both tool sets, lack coverage altogether (that is to say they are less known, if at all).

Problem statement. VR tools are, sometimes, regarded as a potential next step in the evolution of digital modeling and sculpting, yet, as noted before, they are considerably less known or, indeed, used. Considering that tools like Blender are in their own way rather hard to learn for artists working in traditional techniques, it would be good to start from something closer to what they are used to. Yet, that same Blender (Blender Foundation, n.d.) has a sizable following, plenty of tutorials and gained "industry standard" status, while many VR sculpting programs are barely used at all. The issue therefore lies not as much in the type of tool, but in what it allows to do and how it works. This article therefore is a result of my own testing of all three approaches and provides insight into how they compare from an artist's perspective. We are not diving into technical details, code or other parts of inner workings of the discussed methods, rather the comparison is drawn solely on the user experience alone.

Basics. When any comparison between digital and physical arts is made, the first thing mentioned is the amount of creative freedom artists have. Almost any effect, color, shape or a combination of them are possible when the work is an intangible digital object. We are not exactly bound by the laws of physics either, as they matter not, when the shape itself is made from an infinitely thin surface. Remembering my own experiments of remaking (fixing) models in Blender, it is easy to work at a level not available with other materials. VR editors capable of 3D mesh work (or at least ones I have used so far (Gravity Sketch | 3D Sketching and Design Software, 2017)) share this permissiveness. What they lack is essentially the rest of the built-in tooling that is accessible for free and without any extra gear.

Workspace. Different tools have differing workspace requirements and so some are more feasible than the rest, as such, we start comparison here. Working with clay requires clay itself, basic scrapers/shapers and maybe a kiln for firing ceramics. Digital modeling needs a sufficiently powerful computer and that is all. VR needs ample space for tracking markers (wearable sensor set is also a possibility, but harder to set up (Cifuentes, 2016; Weigend & Usman, n.d.; Zju3dv, 2021)), VR-ready PC and VR gear itself. Cost of every option is relative to the amount and quality of necessary equipment, but at least the second option wins in space use efficiency: 1 VR setup versus 4 full-size PC workstations.

Perception. When working with physical material, we can leverage its natural texture and color, whereas digital form needs extra work to achieve the same effect. Artists working with natural materials may find unusual the amount of work required for the same appearance (assuming photorealistic render requirements). Textures for digital objects can also become "too perfect". Meaning that they compare what they should portray about as well as the scale model of a car to its full-size counterpart.

Virtual reality allows us to work and experience things approximately how we would in real life. For example, when trying out one of the virtual museums, fear of heights worked as well as it would in real life, had we been up on the scaffolds. As natural it was to try and walk around a sculptural composition put on display in another app. However… it didn't feel right. Detalization was as good as screens allow (which sometimes was rather pixelated) but what is more important is objects being very close to how they look in reality, with scale, hopefully, being 1:1. Regardless of how well the experience is crafted, it is still feeling like a game, though who would let us into the Sistine Chapel to examine Michilangelo's work as close as we can in the app (IL DIVINO – Michelangelo's Sistine Ceiling in VR, n.d.)?

Workflow. This part is the most interesting, personally, as despite certain similarities between the three methods, all of them differed substantially enough to be unique and present their own challenges. Having had some experience with clay-based sculpting, it is natural to think in terms of physical objects. Preferred style of work therefore involves interacting with tangible, predictable materials, or in other words – as it was done for centuries. There are plenty of trade-offs to be made between size, shape, fidelity and overall composition, but the immediate response from my actions, and an ability to work on "release" version directly, are of importance.

When I had to use Blender, the corresponding equivalencies of tool strength and size were not new by any means. Disconnect between author and the work, however, was. Compared to previous experiences there was certain clunkiness in every move. However, despite it being not as responsive in sculpting, the ability to finetune shapes on a per-vertex basis is most impressive and greatly appreciated.

Making half the shape and mirroring it and in doing so halving the workload is even more enjoyable, since not only we can introduce minute changes, but make them perfectly symmetric if needed. That said, I do see potential in combining both techniques to achieve better results, not necessarily quicker, but more beautiful. This way we can introduce randomness of hand-sculpted real objects into digital works, or on the contrary – produce tangible items from digital masters.

VR modeling could have been the "dream came true" in finally allowing the creative freedom of digital tools, combined with natural ways of working. It works fairly well, when and if controllers are registering where they are in relation to the model. What was a very welcome addition is a set of pre-made materials and textures ready to be applied to any shape of our choosing. Using a "chrome" effect on something and not worrying too much about exact settings is great. Ready-made backgrounds for our virtual studio, built-in photo function photos, capture flyover videos and view models "naturally". That all is overshadowed by one simple question of "why use this when better tools exist?". Feature parity with existing alternatives like Blender is just non-existent. There is not that much currently that VR editors have to offer that can not be obtained by either going the traditional route, usual 3D modeling software or combining both through, let's say 3D printing. Plus there is an always-present question of the health impact of two tiny screens being way closer than they should be.

Conclusion. VR is a promising medium and has the potential to finally become the ultimate modelers' tool, provided that it gains a better integrated toolset. Various programs offered by startups and established businesses have to also work through compatible file formats that are, ideally, compatible with other tools and are fully open-source. In a professional environment any editor with a unique closed-source incompatible proprietary export format (or even worse – lack of export ability altogether) is not a viable investment of time and money and no amount of hobbyist support will make it popular. It is good for quick work or to have some fun but for any other tasks, there already exist manufacturing tools and processes, with more range and flexibility in usage. In conclusion, this is most likely the reason why, despite having access to VR gear, not as many artists and developers actually use VR itself for creative work in modeling and sculpting, at least until feature parity is reached.

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