Educational Technology Review: Unity 3D Game Engine

EDU807: Learning Tools in Educational Technology

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Educators, in order to integrate modern technologies into classes need software tools to design, develop and implement interactive and rich content. To this end, the software application called Unity can be used to design and develop educational content in the form of games. This software, offered by Unity Technologies, a private computer software/entertainment company located in San Francisco, CA, works on multiple operating systems, including Windows, Apple OSX and Linux, as well as various game consoles, mobile devices, and websites, thus making it a cross-platform application accessible to technologists and educators. It can be used for educational professionals in STEM, not only for teaching multimedia, computer graphics, animation, interactive design, and programming, but also to build customized course content (Häfner, P., Häfner, V., & Ovtcharova, J. 2013).

Unity3D is complimented by and can be integrated with many other software applications such as PhotoShop, Maya, MovieMaker, Sony Vegas, 3DS Max, Audacity, GarageBand and many others which are used for developing multimedia assets such as graphics images, audio clips, video clips, and animation sequences. Unity utilizes the programming languages C, C++, and C#. Some of the competing game engines to Unity are Unreal, Torque3D, CryEngine, MonoGame, Horde3D, GameMaker, and Blender.

Game design, as a potential new digital literacy, has educational applications in game-based learning to provide teachers and researchers to incorporate Virtual Reality, Augmented Reality, enabling them to be developers, while providing students to self-direct their learning by creating compelling and engaging simulations and games in their respective curricula (Davies, R.S. 2011).

Unity can also be integrated with many hardware platforms and devices such as Oculus Rift and other VR/AR headsets. Unity provides services such as analytics for gaining insights into player behavior, an asset download store for purchasing multimedia elements to use within the game, deployment capabilities to provide a way to distribute the finished product, collaborative tools, and certifications for users to gain credentials with certain levels of expertise in the application (Pantelidis , V. S., 2017).

The Unity Editor to Enable Creativity, Teach Design Strategies, and Support Project-Based Education

Unity software provides a development editor for authors to create their games and/or simulations. This tool can be learned and used either with or without programming, by educators, students and game development professionals to create the components that go into the game, and establish the storyline and gameplay. This provides an important educational technology tool for the creative endeavors of game-based learning and gamification for teachers to integrate into their coursework. For educational designers, this may be the universal tool or method for instructional design (Dede 2011).

Unity Learn Resources for Educators and Students

The Unity Learn website can be used by educators and students to learn how to use Unity to develop content. It includes video and text-based tutorials, documentation and a knowledge base for reference, training in the form of live classes, and courseware to enable integration into the classroom, as well as paths to certification. This is a web-based component of the Unity software system which enables educators to learn the technological tool so that they can create game content for their courses. This is an essential capability when encountering new software. Oftentimes there is not a specific course to learn new software available or accessible, so by having a web-based resource as well as instructional videos on YouTube, for example, educators can ramp up on the software and start using it either for instructional purposes, as with STEM or Computer Science educators, or for any teacher to utilize it for course design purposes.

As a Tool for Multidisciplinary Education, including Art, Computer Science/Engineering/STEM and General Education

Game development is a cross-disciplinary activity, which can incorporate activities for students from a variety of areas including STEM, education, reading and writing, media and broadcast communications, business, and many others. STEM students can utilize the software for designing, testing and simulating experiments with gravity and physics. General education writing and reading students may utilize it for storytelling. Artistically minded students and curricula can take advantage of Unity3D as a culminating tool after developing multimedia artwork in the many supportive software applications that are available. By including a sophisticated development tool, the educator can enrich their TPACK components (Mishra & Koehler 2008) to have a rich canvas to teach with beyond the mundane tools that are typically used in the classroom.

The Unity Game Engine can be incorporated into ISTE standards for K-12, and used for CCSS and NGSS, but may be more appropriate for higher education. Education professionals in educational technology can take advantage of the tools offered by Unity for interactive course and lesson design and instruction. Even though the high tech capability of developing a game can be considered a far cry from simply instructing in the classroom, having modern tools are essential for enriching the classroom whether onsite or online. (Cuban, L. 1993)

The notion of having educators become game developers will become more mainstream, just as we have sites such as Wix and Weebly to enable web development without programming. Educators need to find new ways of customizing content for courses, and to engage the millennial students that they are teaching. Through the use of Gamification and tools such as Unity3D, educators and researchers can tap into the psyche of these students and find new ways to engage them through incorporating innovative technology that aligns with the ways that today's students receive information. Many of the gameplay experiences that today's learners have, contribute to their construction of knowledge which can be translated from game-player to game creator. Constructivist approaches can be applied (Ben-Ari, M. 2001) when integrating software like Unity in STEM curricula and programs, whether in K-12, or in higher education.

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