

Curriculum

MSEd Program Learning Outcome

CURRICULUM: Explore and translate learning theory, creative curricular design and 21st century skills into instructional decisions and practices to address the educational challenges and opportunities of today and tomorrow.

Explanation

As the world around us continues to evolve and change, educators must keep up with the needs of our students and our communities. Students must have an equitable chance at obtaining a high quality education, especially in STEM and computer science fields. Additionally, developing 21st century skills are crucial to being successful in education, life, and work. 21st century skills include (EdGlossary, 2016):

- Critical thinking, and problem solving
- Creativity
- Technological literacy
- Teamwork and collaboration

By providing cutting edge curriculum while using modern teaching methods and creative curricular design students are able to be exposed to advanced concepts in a personalized and approachable manner that encourages creativity, critical thinking, and 21st century skills.

Keeping up with modern teaching trends and issues is crucial to developing a curriculum that is effective for all students. Some of the modern STEM trends include (Vaden, 2022):

- STEM education for all students
- Starting STEM early
- Utilizing STEM concepts across all subjects
- Accessibility, inclusivity, and equity in education

Southern Oregon's Masters of Education in STEM Curriculum and Instruction has prepared me with the tools to address common teaching trends and challenges, teach 21st century skills, and develop engaging curriculum while promoting diversity, equity, and personalized learning.

I intend to use creative curricular design, including project based learning (PBL), which is “a teaching method in which students learn by actively engaging in real-world and personally meaningful projects.”, with my high school CTE (Career Technical Education) students in order to address the educational challenges and opportunities of today and tomorrow.

Artifacts

Artifact #1

STEM Unit - Addressing Climate Change Through Game Design and Simulation

ED 574 - Issues and Methods in STEM Ed

Rationale

This STEM unit was created as a way for students to both understand and explore climate change issues, and learn the basics about game design, simulation and real time the 3d tool Unreal Engine. Students will discover how they can use game design, simulation, and real time 3d development to bring awareness about climate change and current social issues to teachers, students, developers and researchers from across the globe. Students will explore a climate change issue that is local to students, recently in the news, or a topic that a student is passionate about. Example topics include California wildfires, glacial melting, ocean plastics, CO2 emissions, alternative energy solutions, etc. Students may choose their own topics or one may be chosen from an up to date list created by the teacher.

The goal of the project is to build a platform to geolocate interactive VR experiences and gamified data related to issues of sustainability. Students will be able to geolocate their experience to anywhere on the earth, including their local communities, and create a visual simulation/game that will demonstrate issues going on in that geolocation.

This unit demonstrates the MSED program outcome of the curriculum because of its innovative design, reliance on 21st century skills, inclusion of teamwork, and real world research while developing cutting edge career and life skills. Students will learn about computer science,

real time 3d design, and environmental education with project based learning and experiential education.

This unit corresponds with Next Generation Science Standards (NGSS), California Career Technical Education (CTE) standards and builds on 21st century learning, life skills, and career exploration. The science content that is integrated into this unit includes earth science, climate science, computer science, and data science.

Commitment to Growth Narrative

My goal is to implement a STEM and computer science program for k-12 at my schools within the next 2 years. In addition to creating a schoolwide computer science program, I will continue to attend and speak at multiple industry conferences yearly. Last year I spoke at the International Society for Technology in Education (ISTE) conference and will do so again this year. I will be attending the Games for Change conference, the Game Developers Conference (GDC), in-house professional development, and the Ignite Conference. GDC is considered “the game industry's premier professional event, championing game developers and the advancement of their craft.” (GDC, 2022) and is a great opportunity for me to brush up on my skills and keep up with the most up to date and cutting edge techniques and tools. I will also be having meetings with an Applied Behavior Analysis (ABA) therapist in order to learn more about how to best serve my students on the spectrum.

Professional development for educators helps to ensure the best results for our students. Students will have better learning outcomes, teachers learn new and creative teaching methods and theories, and are able to improve their industry knowledge and connections. (Blanco, 2022). With my continued professional development and growth I will be able to address the

educational challenges and opportunities of today and tomorrow while providing a high quality, creative and engaging curriculum to my students.

Artifact #2

Instructional Design - Game Development and Simulation Using Satellite Data

ED 522 - Curriculum Design & Educational Change

Rationale

This instructional design unit is part of a mission that students and I are working on with IBM Space called Operation Endurance. Students will be working on a project with a real satellite launched by Space X, and managed by IBM Space. Working on real world, hands-on, project based learning projects like this is a huge motivator that shows real-world collaboration on amazing projects, prepares students for careers in high tech industries, and allows for creativity, problem solving and 21st century skills. The project is a group collaboration project to create a playable game/simulation that cleans up space trash, tracks space debris, and communicates back with other students. IBM and Epic Games are collaborating on the project and will most likely feature many of the students involved.

The second stage of this project is to teach programming and how to communicate with a satellite device, analyze the data, and make visual representations of the results. This is an ongoing industry partnership and provides excellent real world learning opportunities. The project is run by my interns and the CTE Intermediate Game Design students help create the simulations.

This educational unit is an example, creative curriculum design that emphasizes the growth of 21st century skills. I am unaware of any other schools that are teaching these advanced concepts in a unique and creative manner. This unit puts students on the forefront of technology, science, and space exploration. By incorporating multiple disciplines with this computer science and real time 3d lesson I am able to address the educational challenges and opportunities of today and tomorrow. The goal of this unit is, in collaboration with IBM Space to “streamline the process for getting school-aged children access to the wonders of space - in order to inspire the next generation of future space explorers and leaders.” (Altaf, 2022).

Commitment to Growth Narrative

In addition to industry partnered programs such as this, we participate and run game jams and 3d art jams each week. Jams are short competitions, usually between a couple days and a month long, where students/participants team up, or work solo, to create a game or art piece that fits a given theme.

My programming students participate in coding and hacking competitions as well, such as the Cyber Patriots competition, which is “the Air Force Association's National Youth Cyber Education Program, created to inspire K-12 students toward careers in cybersecurity or other science, technology, engineering, and mathematics (STEM) disciplines critical to our nation's future.” (Cyber Patriot, 2013). These competitions build real world skills quickly, encourage creativity, and position students to tackle real world problems and even get hired in the industry. This is a great way for students to learn 21st century skills like teamwork, problem solving, creativity, and critical thinking, and it’s a great way to develop skills quickly by doing project based and experiential learning.

References

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