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Dear WOU Faculty,

Having spent the past year and a half in the Educational Technology program, I have been exposed to many readings and podcasts that have made an impact on myself as well as my teaching. I have developed an interest in the connection between creativity and technology in an academic or classroom setting. My goal for this focused reading list is to share what I have learned with others, primarily other teachers, so they can gain knowledge and other resources related to creativity and technology.

I chose to focus this reading list on creativity and technology for a few reasons. One major reason is because there has been an abundance of technology being brought into our education system and classrooms. This past year and a half students and teachers have primarily been learning digitally. With that being said, it is important that students are still receiving opportunities to be creative and develop problem solving skills. Technology has the ability to intertwine creativity into learning. I wanted this to be a big focus within this reading list. I also want it to act as a resource to teachers, whether they are technology experts or novices. This reading list should be something that they can read and listen to, and then be able to implement it in their teaching.

This focused reading list will include books, peer reviewed articles, as well as podcasts and TedTalks. The reason this reading list includes more than just books and peer reviewed articles is because I wanted to expand the types of media included. A learning outcome to the Educational Technology program is to “build capacity to adapt to and work with diverse media types across multiple platforms to create and support authentic learning relevant to the learners and their learning contexts”. I think it is important to note the vast variety of diverse media types that learning can occur through, which is why podcasts and TedTalks are included within this focused reading list.

Sincerely,

Lauren Tennyson

Introduction

This focused reading list will be based around creativity and technology and how they work together. The intended audience for this reading list is for teachers and school staff who are looking for information and resources based around how creativity and technology work together and how they can be implemented in an academic or classroom setting. As our world experiences an increase in use of technology, it is important that we continue to stress the importance of it in our classrooms. However, we still want to continue to be sure our students receive opportunities to express creativity and develop skills such as problem solving and innovative thinking. The reading list will include resources such as books, peer reviewed articles, as well as podcasts and TedTalks that discuss the incorporation of creativity and technology in our teaching.

Books

Ignite Creativity in your Chromebook Classroom by Ben Sondgeroth, 2020, published by Book Creator.

This ebook acts as a resource for teachers. It provides a variety of technology based applications students can use. The focus of the ebook is based around using the consumption mindset to a teacher's advantage. Essentially students are turned into creators of the material they are consuming or learning about. Through that experience, students are able to act and think creatively while still acting up the material that is being taught within the classroom. The technology aspect in these tools allow students to create with voice, video, images, or a combination of these. There are eleven applications/programs that are discussed within this ebook as well as classroom ideas on how to utilize them. The programs include Book Creator, Soundtrap, Vocaroo, The Chromebook Camera, Screencastify, WeVideo, Adobe Spark Video, YouTube Creator Studio, Flipgrid, Google Drawings, and Adobe Spark Post. It is organized into four different content areas: turn your students into authors, leverage the power of the microphone, students as video creators, and students as image creators.

This resource is thoroughly developed. The ebook itself is interactive with links that take you to the resources as well as videos. There are a variety of programs that are discussed in depth. One of my favorite parts of this resource is not only does it explain the programs, but it provides ideas on how to incorporate them into classroom activities.

The Innovator's Mindset by George Couros, 2015, published by Dave Burgess Consulting Inc.

This book focuses on innovation within teaching and learning. The book is split up into different sections; the first part is based around innovation and what role it plays in education. The second part is in regards to how to get there: creating relationships and learning. It also focuses a lot on

empowering students rather than engaging them. Couros explains the difference between school and learning. School promotes starting by looking for answers, while learning promotes starting with questions. The third part discusses how to lead, create meaningful learning experiences, and the power of collaboration between educators. The last section is more of a reflection of how the reader will go forward after reading the book. The book's goal is to help educators empower students to wonder, explore, and think critically and innovatively. Couros also discusses the eight things to look for in today's classroom: voice, choice, time for reflection, opportunities for innovation, critical thinkers, problem solvers/finders, self-assessment, and connected learning. It also comes with a lot of technology resources and examples of teachers using technology in their classrooms, but in very different ways (even ways you wouldn't typically use a certain type of technology). It allows you to interpret your teaching, leadership, and own learning and how to make it more innovative. After every chapter there are discussion questions to help you do this.

This is a must read book when it comes to education and technology. It hits so many different aspects, and it really makes you think about how you are utilizing technology within your classroom.

Peer Reviewed Articles

A 21st-Century Art Room: The Remix of Creativity and Technology by Courtney Bryant

One teacher recounts her experience in a graphic design course when she was in school. There was a huge lack of creativity and exploring a program on their own, everything was done and created through instructions. Everyone was creating the same or similar artifact through printed and spoken instructions from the teacher. Flash forward fifteen years and this student is now a teacher using technology and art. She puts together a case study with her computer animations class to show how creativity and technology can go hand in hand to make it a much stronger learning experience. Within this study there were five different creative problem solving strategies used within the course. The results were powerful, students were way more engaged and motivated in the work and projects. Students would ask others for help, creating collaboration, feedback, and empowerment.

This is a great example of the amount of different and creative projects that can be created when we allow students to explore and be creative with their work. This was a great read in regards to how technology and creativity can go hand in hand, but also the power of implementing change in the education process.

Creativity in Technology Education: Providing Children with Glimpses of Their Inventive Potential by Theodore Lewis

This article focuses on Theodore Lewis's concern that the need to be creative or use of divergent thinking is not as relevant in education as compared to convergent thinking. There is a stress to use standardized tests as a measurement of achievement/accomplishment. This is a very concerning issue. Lewis brings this up in his article, *Creativity in technology education: providing children with glimpses of their inventive potential*, and takes several studies to show that technology education can help students develop their creative thinking through different projects and activities. Lewis discusses this within five different sections/topics: focus on design, emergent classroom practice, emergent research on children designing, inventiveness and the curriculum, and coming to grips with creativity and invention. He specifically referred to a study that involved a design course. Students had to create portfolios or prototypes, which students displayed high levels of creative thinking skills. Through the technology education of this study such as design and inventive activities, it showed that students were able to develop their creative potential.

This article portrays using technology education to challenge students and allows them to see that they are capable of using critical thinking skills as well as creativity and inventive potential. Utilizing concepts discussed in the article would be beneficial in the classroom.

Development of Pedagogical Creativity of Future Teachers of Primary School By Means of Innovative Education Technologies by Margarita Andreevna Shkabarina, et al.

This article brings up the importance that the training of future teachers is something that needs to be reframed. So often than not, the training still focuses on the "traditional" methods of teaching. Granted there are some courses that touch a little bit on the newer methods, but our future educator programs need to be revised to meet the current needs of today's classroom. A recent study takes a closer look at this, while also touching base with creativity. The study poses the following questions: 1. Is the strategy of innovative educational technologies effective in the development of pedagogical creativity of the future primary school teacher? 2. What kinds of innovative pedagogical technologies are the most effective for the development of pedagogical creativity? 3. Will the introduction of innovative educational technologies in the process of professional education of future primary school teachers influence the growth of quality indicators of pedagogical creativity of students? The participants of this study were students in the first and second years of an education program. It involved a control and experimental group as well as a pre-experiment test and a post-experiment test. The study resulted in confirming that the strategy of using innovative educational technologies is effective in the development of pedagogical creativity of future elementary educators. The study also mentions that by doing this

it encourages students to take initiative, creativity and active position in all types of learning activities, and by doing this will increase the effectiveness of learning. This study brings up an important aspect that relates to future educators, "In today's social context, there is a need to form a new generation of elementary school teachers, namely, professionals with high levels of pedagogical creativity who are able to depart from traditional methods of organizing the educational process" (Shkabarina, Verbytska, Shemchuk, & Saleychuk, 2020). The training of our future educators is so important. The coursework of these programs needs to reflect the current teaching within the classroom. This article is extremely important, and definitely worth looking into if you are a future educator, newer educator, or even a mentor teacher.

Elementary Students, Creativity and Technology: Investigation of an Intervention Designed to Enhance Personal Creativity by Romina Jamieson-Proctor and Paul C. Burnett

This article focuses on a study done to determine if purposeful integration of technology would result in positive effects to personal creativity characteristics of students. Within the study there were three different groups, a group that received an intervention program, a group that received the intervention program and computers, and another group that did not receive any program and did not change their school curriculum. There were four units of intervention within the program and they fully integrated curriculum that would be covered in the upper elementary years. The intervention program units often required students to build and design something that included various projects. Teachers were provided training. Students were tested through a creativity checklist (based on a three point scale) two times, one in February and the other in December. The study resulted in the group that received the intervention program and the computers showed an increase in positive creative characteristics.

This was a pretty interesting study; while skipping to the outcomes gives a brief overview of the benefits, reading through the article gives a deeper understanding of how certain intervention groups enhanced personal creativity. It shows how impactful having tools such as a computer can help aid the creative thinking process.

Infusing Creativity and Technology in 21st Century Education: A Systemic View for Change by Danah Henriksen, et al.

This article breaks down what creativity is and how it can be achieved within a 21st century classroom that utilizes technology. It begins by explaining that technological change in our world is driven by human creativity. There is a relationship between technology and creativity, and there is a large emphasis on teaching this connection in our classrooms. The article also brings up how creativity begins to dwindle over a child’s life because the conventional approach to education causes a decline to the student’s natural inclination toward creativity and divergent

thinking. The article then discusses how there must be an openness toward new technology and intellectual risk-taking. There are three aspects that play a part in approaching creativity in 21st century education: teacher education/professional development, assessment, and educational policy/curriculum. After discussing each of these three aspects the article gave recommendations for each. Some of the recommendations were to develop teacher education curriculums that integrate technology and creativity across the program, encouraging new teachers to "play" with new approaches to using technology in the curriculum, exploring a variety of assessment formats, using evidence based research on creativity and technology, the need for creativity and technology to be featured in policy at all levels, and embedding technology and creativity across the curriculum for all learners.

Overall, this was a great article that was able to really break down the meaning of creativity and how it is applied to technology, as well as the connection between the two. It gave recommendations towards the three key aspects towards approaching creativity in a 21st century classroom.

KIKS Creativity and Technology for All by Anthony Houghton, et al.

This is an article that explains what KIKS is (Kids Insprings Kids in STEAM). While this is an EU project, it still shows some great information that can be brought into the US. The article explains that fewer and fewer schools were taking on STEAM subjects and projects. So in order to promote STEAM, Project KIKS was created and a challenge was developed by asking students in Europe "How would you get your schoolmates to LOVE STEAM?" The article goes into depth about inclusion, process, and tools. It also discusses the student projects created and their artifacts. Some topics of the projects were: conservation of energy, a Kitronic buggy (robot), the future of transportation, and chain reactions. Through the KIKS project, the importance of collaboration internationally was big. Students were able to share and then enhance their projects through collaboration with other students. Lastly, it talks about the positive results they received from students in regards to the event and that they learned and felt more positive about STEM.

Robotic Technology for Figural Creativity Enhancement: Case Study on Elementary School by Billy Hendrik, et al.

This article is based on a study done to see if robotics can cause figural creativity enhancement in elementary school students. Robotic technology helps students be more active in the learning process. There is a belief that in order for children to be ready to work in a world full of technology we must develop a creative spirit from children as well as through technology. Educational robotics offer students hands-on, fun activities that fuel students interests and curiosity. Within the study, the students' creativity skills were measured through the Figural

Creativity Test, once prior to the intervention and once post intervention. The students participated in a seven task intervention. The results were that integrating robotic technology in learning activities improved figural creativity within the elementary school students and can be a positive educational tool in classrooms.

Students' perspectives on different teaching methods: comparing innovative and traditional courses in a technology program by Luciana Debs, et al.

A lot of the time, innovative methods take a different stance on teaching compared to the traditional models of teaching. This article discusses how one school developed a pilot program that focuses on an innovative teaching model. This teaching model tends to be student-centered, it allows students to have some power in their learning, take on responsibility, as well as use their creativity to solve problems. The pilot program involved a design lab, seminar, as well as mentoring. Within this program students participated in a lot of project based learning, collaboration, and exploratory projects while still learning and focusing on something in particular. This study allowed them to discuss the findings of students' perspectives of the pilot program compared to the traditional program that is more lectured based. Students mentioned that the pilot program allowed them more leniency to design their experience to fit the needs of what they wanted to do in the future. Due to the nature of the pilot course it was gradeless and more so competency based, they were working towards badges. However, a common theme was that students were more focused on the project at hand because there wasn't the need to cram for a test like you see in a more traditional model of learning/teaching. The skills students learned throughout this pilot program were skills that would be necessary for a future profession. It is clear that this pilot program style has some major benefits.

This resource is a good reminder that student centered learning as well as project based learning are very important in the learning process. Through project based learning, collaboration, and exploratory projects students are able to think creatively and develop a deeper understanding of the content because they are the center of it.

What core competencies are related to teachers' innovative teaching? By Chang Zhu, et al.

The world is constantly changing, education models and teachers need to keep up with the current changes. In the education world it doesn't make sense for educators to continue with the same ways of teaching for many years. There is a need for change; educators are having to be creative in the ways they teach their students. The needs are different than they used to be, what used to get a student's attention now doesn't. This study takes a look at what goes into a teacher's innovative teaching. Within this study they took a look at teachers' learning

competency, social competency, technological competency, and educational competency. They used surveys to ask certain questions regarding the core competencies of what goes into innovative teaching. What they found was that three out of the four core competencies were significant indicators of a teacher's innovative teaching performance. They found that educational competency as well as technological competency were most strongly related to a teacher's innovative teaching. It is clear that these four components allow us to decipher and get an idea on what a teacher's innovative teaching performance is like.

This article is a great reference to innovative teaching and what goes into it. This would be a great resource for any teacher. It may help educators locate areas within their own teaching that may need improvement.

Why 3D Print? The 21st-Century Skills Students Develop While Engaging in 3D Printing Projects by Torrey Trust and Robert W. Maloy

A large part of creativity is through innovative thinking. One example of innovative methods within the classroom is using 3D printing. This article discusses a study done to determine what skills and knowledge students are learning through incorporating 3D printing within the learning experience. Within this study, there were 51 educators that completed surveys based around the impact of 3D projects on student learning in classrooms. There were multiple choice questions as well as a few open ended questions. Participants reported back that students had developed a variety of skills such as: 3D modeling, creativity, technology literacy, problem solving, self-directed learning, perseverance, and critical thinking. Within the research it states, "Most participants (90%) felt that their students developed creative thinking and design skills by working on 3D printing projects." (Trust & Maloy, 2017) It also mentions, "Technology literacy, including the basic computer skills in order to complete 3D printing projects, was the third most important skill reported by survey participants (88%)." (Trust & Maloy, 2017) Through using innovative technology within the classroom, students are getting hands-on experience, as well as developing key skills that will take them further in life, and potentially in the job force. These are very valuable experiences that should be in all schools.

Podcasts/TedTalks

Do Schools Kill Creativity by Sir Ken Robinson (TedTalk)

In this TedTalk Sir Ken Robinson talks about how schools are lacking creativity and not showing it as an importance when it really needs to be. Robinson explains how the structure of education is shifting and how we need to rethink our view of intelligence. He brings up the importance of incorporating the arts and other subjects that are deemed not academic or "useful". In those subjects students are able to express themselves. However, when we continue to view

intelligence in terms of only academic or core subjects there will be students who will always view themselves as unintelligent or not good enough because the subjects they were good at in school were never valued. He brings up an example of a young girl who was unable to concentrate and was fidgeting a lot. Her parents believed she had a learning disorder, however the doctor assessed the girl and then left the room with the music turned on. When the doctor and mother left the room, the girl began to dance. The doctor told the mother that she was a dancer and should be taken to dance school. That is what they did and the young girl became a dancer and a choreographer, opened her own dance school and was responsible for some of the most popular musical theater productions in history.

This is a fantastic TedTalk. It really begins to highlight how important it is for educators to rethink the purpose of schooling and the principles of how we view intelligence.

The Creative Educator Podcast: 2020: Education in Design Mode

In this episode of The Creative Educator Podcast, Tacy Trowbridge brings on Richard Culatta, the CEO of the International Society for Technology in Education (ITSE). In this episode there is a lot of discussion on how education has been placed in a digital/virtual space. Culatta brings up that the silver lining to all of the craziness is that educators are being forced to try new things and that everyone is in design/creation mode. He brings up that there is a lot of innovativeness occurring. Within the episode he brings up some issues that need to be worked out as well as some successes. The ability to collaborate and learn from others beyond your current location is something that is going to be crucial to growth as well as our future. Trowbridge brings up a question of how teachers teach creative thinking skills, and Culatta begins to explain the ITSE standards and how educators can use these standards as guideposts to use technology to develop conceptual skills. There is also discussion on how our happiness is related to our ability to be creative. A big concept that is also brought up is that in order to be creative you must know how to use the tools necessary, this then goes into the discussion of how we need to teach how to use the digital tools.

Overall, this podcast episode was well done. Richard Culatta has a lot of passion behind his work and it is clearly evident when listening to him speak. There was a lot of good information within this podcast episode.

The edTech Take Out: Cultivating Creativity (Podcast)

This podcast in general talks a lot about the world of educational technology. This episode in particular discusses how students and teachers can use technology to cultivate creativity. This episode begins by discussing the 4 C's (critical thinking, collaboration, creativity, and communication) and how it will focus on the creativity aspect. Jonathan and Mindy discussed a lot about the various tools and programs teachers can incorporate into their classrooms and how

to implement them. They discussed how important it is to find ways to incorporate creativity in the instruction each day. Mindy brings up a point that creativity is often perceived as “let's get out the paint or art stuff” when in reality, creativity isn’t only about art. They also discuss how everyone has creativity in them, and that it begins with a mindset and the ability to creatively problem solve and how this looks different for everyone. This podcast episode brought up a lot of ideas and different implementations that teachers can actually try out in their classrooms. Another thing that is helpful is that everything they talked about is available in their show notes of the episode, which makes it easily accessible to teachers.

Conclusion

We have seen an increasing amount of technology being introduced into education and learning. There is also an increasing need to bring creativity into the classrooms. The goal of this reading list was to shed light on the question, “How do we bring technology and creativity together in order to enhance teaching as well as learning?” Through this reading list there was an emphasis on what creativity and technology look like in the classroom, as well as methods and resources for educators on how to apply it. This is important to the field of education because these are relevant needs that students need to be exposed to and experience in order to prepare them as they get older. When we combine technology and creativity, students are able to experience something besides the typical/traditional methods of teaching. While the projects that come through that include the conjoining of creativity and technology are new and different, students are being exposed to and learning so many different skills, and oftentimes are more engaged in the learning. This is something that I hope to see more implementation of in classrooms in the next years to come.

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