**References**

Baert, Helena, "The Integration of Technology within Physical Education Teacher Education: Perceptions of the Faculty" (2011). *Theses and Dissertations. 203*. Retrieved October 31, 2020, from <http://scholarworks.uark.edu/etd/203>

This is a comprehensive paper on the benefits of incorporating technology in the classroom. This article goes on to talk about how although there are benefits, there is research on how teachers feel inadequately prepared to implement technology in their classes. This article attempts to show how teachers can prepare themselves to effectively incorporate technology and specific methods of incorporating it. It answers questions of what types of technologies are already incorporated in classrooms, what PE teachers think their current proficiency levels with technology is, how PE teachers are incorporating technology into PE courses, what factors effect technology use in the classroom, and how you can more efficiently integrate technology. In addition, this article provides many stats and graphs that give a visual representation of how technology is being incorporate and how it is beneficial. This paper is a beneficial read as it shows us that teachers do not feel adequately prepared to use technology in PE, it helps us understand why PE teachers are tentative when considering the implementation of technology, and it provides us with helpful ways to get informed and feel more confident about the use of technology in physical education.

Baek, J., Keath, A., & Elliott, E. (2018, August). *Physical Education Teachers’ Technology Practices and Challenges*. Retrieved October 31, 2020, from https://www.researchgate.net/publication/327772190\_Physical\_Education\_Teachers%27\_Technology\_Practices\_and\_Challenges

This study looks into current technology practices, learning sources for technology integration, and the different influential factors for PE teachers’ use of technology. This study gathered a group of one hundred and nine participants to participate in a web-based survey. The study found that teachers have a higher tendency to use technologies for teacher practicality and efficiency rather than for the students benefit and learning. This study shows the need for quality training to help PE teachers successfully integrate technology for the students benefit. In addition, this article also shows us valuable information such as what forms of technology are used most (through a chart with percentages) as well as how teachers can get more informed about the integration of technology. This article is useful as it gives us tangible data about how PE teachers are feeling concerning technology use and gives us insight on what type of technology is being used and the areas that it affects.

Casey, A., Dr., & Jones, B. (2012, March 12). *Using digital technology to enhance student engagement in physical education*. Retrieved November 04, 2020, from https://www.tandfonline.com/doi/pdf/10.1080/18377122.2011.9730351?needAccess=true

This paper explores the idea that video technology can be a beneficial tool for student engagement in the classroom. In this specific paper, the experiments done are to test student’s ability to comprehend throwing and catching movements and how the use of video technology progressed this understanding and helped students become more engaged in their learning. The results of this experiment were focussed on three aspects: deeper understanding, quality of the learning environment, and connectedness; however, there were also unexpected results that were recorded such as increased participation from previously marginalized students. It was noted that all students who were studied displayed a deeper knowledge of the skills and the key components of these skills. The research in this article gives us an idea of how we can incorporate technology to engage the students and help foster a deeper understanding in physical education.

Casey, A., Goodyear, V. A., & Armour, K. M. (2016, September 19). Rethinking the relationship between pedagogy, technology and learning in health and physical education. Retrieved November 04, 2020, from https://www.tandfonline.com/doi/pdf/10.1080/13573322.2016.1226792?needAccess=true

This research paper focusses on two main questions: how could a pedagogically driven approach to the use of DigiTech in health and physical education benefit young students learning? And what steps are required to develop new DigiTech pedagogies? This paper suggests that pedagogy spans three dimensions: learners and their learning, teachers and their teaching, and knowledge in context. The learners/learning dimension encompasses children and diverse learners and the ways in which they can be supported effectively. The teachers/teaching dimension encompasses teachers and their responsibility to be lifelong learners who continually reflect on their personal capabilities and the needs of their students. The knowledge in context dimension refers to the importance that is place on things that are being taught. This paper suggests that the place where these three dimensions crossover is where there is opportunity for the use of DigiTech. It determines that DigiTech is intended to help learners learn more fully as teachers use it in the proper context. It concludes with stating that that, "DigiTech crosses multiple sectors (e.g. education, journalism, sport), multiple contexts (e.g. home and school), and can be used in multiple ways (e.g. improve learner–learner interaction or personalised learning). As an academic profession, therefore, we will do our young learners a disservice if we simply subscribe to a pessimistic view of the role of DigiTech."

Feith, J. (2020, February 06). The SAMR Model: Technology In Physical Education. Retrieved November 03, 2020, from https://thephysicaleducator.com/2020/02/06/the-samr-model-technology-in-physical-education/

The SAMR model is a model created by Dr. Rueben Puentedura in 2010 that is used to integrate technology into the classroom in and interesting but meaningful way. SAMR is an acronym that stands for substitution, augmentation, modification, and redefinition and has two levels, teaching and learning are enhanced by technology, and teaching and learning are transformed by technology. The substitution step is where technology provides a direct substitution without changing the learning task. The augmentation step is where technology is a direct substitution for another tool but also provides some form of functional improvement. The modification step is where technology allows redesign of a task to occur. The redefinition step is where technology allows for the creation of new tasks that were not previously possible. After the in-depth explanation of each of these steps, the article explains how this applies to PE and how to utilize this in your PE classrooms.

GopherPE. (2016, September 09). *Technology in Physical Education part 1* [Video]. Youtube. Retrieved November 03, 2020, from https://www.youtube.com/watch?v=O-utcTu\_ho8

This is a lengthy Webinar that discusses technologies place in physical activity. The Webinar begins with providing some stats on the amount of time kids spend using technology on a regular basis and explaining how children are raised and encouraged to use technology from a young age. It then goes on to discuss different benefits technology provides from extending your learning opportunities to expressing yourself and your feelings to progressing yourself physically by using things like heart rate monitors and nutrition apps. The next thing covered in this webinar is what technology in PE really means. It gives a detailed description of what technology can mean in PE and how it can be incorporated; for example, exergaming, different gadgets you can use, brain breaks, active gaming, apps etc. Finally, this webinar goes over, in detail, the pedagogy of technology in PE and the nitty gritty details of how teachers can incorporate and apply this. They focus on the three E's, effective, efficient, and excellent, as they explore the process of implementing technology in physical activity. This is a beneficial read as it goes through how to incorporate technology in really great detail and sets an outline for what you need to consider each time you integrate it.

Hanski, M. (2016, July 14). *Gym Classes Go Digital: How Tech Changes Physical Education*. Retrieved October 31, 2020, from https://blog.capterra.com/gym-classes-go-digital-how-tech-changes-physical-education/

This article talks about the proven benefits of technology in the classroom. It gives us tangible stats such as how technology use in PE helps students reduce stress (45%), improve confidence (46%) and efficiency (57%), while also helping students to better prepare for class (67%). The article then goes on to tell us that incorporating administrative software helps students improve study habits and overall learning. It states that podcasts, games, and other forms of technology help engage students, get them excited about physical activity, improves their mental organization of knowledge, and has an overall positive impact on student’s health. Finally, this article goes into discussing the types of technology you can incorporate into the classroom, how to incorporate it, and why you should consider implementing it in your class. Some examples it provides of things you can include are Coaches Eye, Team Shake, Nintendo Wii, Edublogs and more. This article gives us a comprehensive look at the benefits technology has on students, both physically and mentally, and is useful for gaining background knowledge on why we should consider incorporating technology in our PE classes.

# Jenny, Seth. [Seth Jenny]. (2017, Jul. 25). *Technology Integrated Lesson in Physical Education* [Video]. YouTube. Retrieved November 2, 2020 from <https://www.youtube.com/watch?v=Ffrr_DrAY4E>

This is a YouTube video of how an elementary school in Fort Mill, SC is incorporating technology into their PE class. I decided to include this video as it displays the integration of technology rather than just talking about it. This video shows how the teacher is using music, timers, a smartboard, and video delay technology in his class. With the smartboard the teacher uses it to review techniques and main points covered in the previous class, for a cardio game involving coloured squares where you must follow the instructions that come up on the board, and for a basketball target game where you practice tossing the ball at the moving target that is projected on the wall. For video delay, the teacher uses an app or program that records the students as they are shooting a basketball so they can watch it back and slow it down to see their form and how they can potentially improve it. I thought this video was beneficial as you could see the actual implementation of some of the suggestions I have been reading about. I also thought this was a good video as it is basketball specific so it will be useful when I attempt to integrate the knowledge from this bibliography into my skill builders for my second extension assignment.

Kohl, H. (2013, October 30). *Physical Activity, Fitness, and Physical Education: Effects on Academic Performance*. Retrieved November 03, 2020, from https://www.ncbi.nlm.nih.gov/books/NBK201501/

This research piece suggests that increasing physical activity through physical education, recess, and physical activity in the classroom may improve academic performance. This piece provides evidence that mathematics and reading are the subjects most highly impacted by physical education. It is explained that brain health is the key to academic performance and the brain is highly influenced by physical activity. The brain is responsible for functions such as attention and memory capabilities, all of which are impacted by aerobic fitness. The article also explains the children are the ones most effected and benefit the most from this. I liked this article as I found it interesting to dive into the neurological side of things and see the effects and benefits of physical activity on the brain. Overall, this article explains the evidence for how physical activity is beneficial for students’ academic performance and overall health and how it should be regularly implemented in schools. Although this is not a technology specific article, I included it because I think it is important to have a foundation and background knowledge on what physical activity is and why it is important. In order to understand technologies place in PE, we first need to understand PE’s place in education.

Mears, D., & Hansen, L. (2013, January 18). Technology in Physical Education Article #5 in a 6-Part Series: Active Gaming: Definitions, Options and Implementation. Retrieved November 05, 2020, from https://www.tandfonline.com/doi/pdf/10.1080/08924562.2009.10590864?needAccess=tru

This article defines active gaming and the types and categories it encompasses. It explains active gaming, also known as exergaming, as, "...video games that provide physical activity or exercise through interactive play, these games go beyond simple hand/finger movements as the primary interface and require the user to apply full body motion to participate in virtual sports, group fitness exercise, or other interactive physical activities." It then goes into detail about the types of categories of active gaming which include rhythmic step sequence games such as dance dance revolution, virtual bicycle ergometers such as Cateye games bikes, balance board simulation games such as XrBoards, martial arts simulators such as 3 kick interactives, Sportwall, and Hopsports. The article then goes into explaining why you should include active gaming in classrooms, recommendations for funding, and the implementation of active gaming in the classroom. Research has shown that active gaming doubles the amount of energy expenditure, significantly increase heart rate, step counts, and may have positive benefits on overall health combating things like child obesity and sedentary lifestyles.

Pagniello, D., Olsthoorn, A., & Hezewyk, L. V. (2011). *Integrating Technology with Physical Education*. Retrieved October 29, 2020, from https://www.google.ca/url?sa=t%2C

This article was put together by three men for the TCDSB H PE conference in 2011. The goal of this conference was to discuss what technology is, why it should be included in the classroom, and ideas of how this can be implemented. They define technology as any device that makes our lives easier and increases our control over the environment. Educational technology is then defined as the devices and organizations for analyzing problems and devising, implementing, evaluating and managing solutions to these problems. Technology in PE can help make our lives easier, help us solve problems, and help create a fun and new experience. This article also lays out ways in which technology can be implemented directly in PE and also smaller intermittent interruptions throughout the day. This conference lays a basis for what technology in PE is and is useful for understanding the meaning of it and comprehending the terms surrounding it.

School Specialty. (2018, November 27). *6 Ways to Integrate Technology into Physical Education*. Retrieved October 29, 2020, from https://blog.schoolspecialty.com/6-ways-integrate-technology-physical-education/

This is a short blog post by Schoolyard on some of the main ways of incorporating technology into physical education. It is a very basic article that looks at areas including pedometers, heart rate monitors, health tracking apps, video resources, and games. The article breaks down each of these areas and explains what they are and how they can be used. Pedometers and heart rate monitors are devices used to measure health related aspects such as steps and heart rate and health tracking are programs used to store and track this information. This could be incorporated into PE classes to help gain a further understanding of students’ progress and to track it. On top of these, apps that help with nutritional factors and step counting, video resources, and games such as Wii Sport and Dance Dance Revolution are all things that can be incorporated into PE as an added benefit and to keep things interesting and fun.

Silverman, S. (2012, April 20). Technology and Physical Education: Present, Possibilities, and Potential Problems'. Retrieved November 04, 2020, from https://www.tandfonline.com/doi/pdf/10.1080/00336297.1997.10484246?needAccess=tru

This article considers both the present and future possibilities of technology in physical activity. Silverman believes the presently, we make good use of computers and video technology; however, there are many possibilities that we could progress towards and expand to. He believes that in the future, technology may assist with instruction by means of demonstration and interactive learning activities, monitoring physical activity of children and providing feedback on how lessons can be improved, and areas of classroom work could be recorded electronically with a quick feedback option. We may also see progressions in the technological platforms both teachers and students use and interactive video and activity technology. In addition to discussing the current and future possibilities of technology in the classroom, this article also takes a look at the potential problem’s technology may cause. The problems highlighted are funding and the disparities that could occur across the board, the potential lack of actual physical activity that may occur if technology takes over, and the lack of teacher training in the area. In his final statement, Silverman concludes that the potential technology provides is vast as long as it is used appropriately and effectively. I thought this article was helpful because it discusses not only the benefits but the potential problems. This is useful as it may help us avoid these problems if our attention is brought to it.

SupportRealTeachers.org. (n.d.). Technology in Physical Education. Retrieved November 03, 2020, from https://www.supportrealteachers.org/technology-in-physical-education.html

SupportRealTeacher.org is a website that provides a plethora of resources for teachers. It discusses the SAMR (Substitution, Augmentation, Modification, Redefinition) model and how each of these categories has a role in physical education. It has links to resources that include frameworks for integrating technology in PE, Guidelines for K-12 online physical education, the SAMR model, links for activities, sample lessons, instructions on planning, gamification and more. This website provides all the information you could need to incorporate technology in PE.

The PE Geek. (2017, December 10). Episode 100 - One Hundred Ways to Use Technology in PE. Retrieved October 29, 2020, from https://thepegeek.com/2017/12/episode-100-one-hundred-ways-use-technology-pe/

This is a podcast done by The PE Geek that goes over 100 creative ways to incorporate technology in physical education. The podcast goes over several categories of technology that have a unique place in the classroom. The first category they discuss is called "Fun and Fitness" which discusses a plethora of different apps that can be used for fitness such as sweat deck and fitness bingo, and fitness roulette. The next category they discuss is the use of video and video equipment in physical education which can include things like SloPro and VideoTagger, for recording skills and analyzing them, and GoPros and iMovie, for other recording purposes. Next, they talk about technology as a way of evaluation and assessment for teachers to use. They also make note of the use of google in PE for things such as storing data from classes, doing written work, taking quizzes, creating a digital portfolio *etc*. PE Geek also includes sections about active gaming that are not app specific and other useful tool-based technology. This podcast is a very comprehensive list of the possibilities for technology in PE and provides countless suggestions that can be utilized in the classroom.

Vernadakis, N., Giannousi, M., Ph.D., Tsitskari, E., Antoniou, P., & Kioumourtzoglou, E. (2012, January). A Comparison of Student Satisfaction Between Traditional and Blended Technology Course Offerings in Physical Education. Retrieved November 04, 2020, from https://files.eric.ed.gov/fulltext/EJ976936.pdf

In this article, blended learning is defined as the mix of face-to-face instruction with the additional use of various technological tools. Research found that blended learning offers multiple modes of learning which helps support diverse learners. It also shows that blended learning is preferred by students rather than a straight traditional format. The article states that blended learning provides students with more flexibility and created a more interactive experience that cultivated higher levels of interest and self-exploration. This article is useful as it suggests the use of a combination method that includes both traditional methods of instruction and technological methods.