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Part One: Five Phase Description of PBL Experience

Phase 1 : Entry event, driving question, learner collaboration, community partner, project length (3 weeks)

The overarching objective of my PBL experience is to expose students to computer science by analyzing and developing solutions to authentic problems through mobile application development. Students will be exposed to block based coding in order to program and create their own mobile application. On page 92, Larmer says that the driving question should include three different parts. He states these parts as "(1) engaging for students, (2) open ended, and (3) aligned with learning goals." Using these three criteria, the driving question for my students is the following: "How can I create my own mobile application that can be used to meet someone's needs?" I believe creating a mobile application will be engaging for students. I left the question open ended as I did not state what the needs should be. It could be as simple as entertaining someone, or as sophisticated as an educational fitness application. Lastly, it aligns with both of my learning goals and some South Dakota technology standards.

6.ET.OC.3.4 Incorporate a variety of technology applications to create a product with teacher guidance.

6.ET.CT.3.1 Identify the appropriate digital application to complete a task.

For my entry event, I would begin with explaining about algorithms/flowcharts to get the students to begin to think sequentially, which is important in computer science. I would explain what they are, show how they are used, play an entertaining youtube video I have used previously from the TV show "The Big Bang Theory" about a "Friendship Algorithm" (

https://youtu.be/k0xgjUhEG3U), and finally I would have students pick a common daily task such as making a sandwich, walking the dog, or brushing teeth and have them draw me a step by step algorithm to complete the task. It would allow students to understand the importance of solving problems one step at a time, which is crucial when working with computer programming. Next, students would trade their algorithms with a partner to get feedback and collaborate to see if their algorithm needed refining. Once students have a firm grasp of algorithms and flowcharts, we would move forward towards our project of creating a mobile application. My project length will be three weeks long.

Phase 2: Describe what learners need to know to answer driving questions.

I will be using the website http://appinventor.mit.edu/, which is a great basic website for beginners to start creating applications. MIT application inventor has some great tutorial apps with step by step instructions and videos which allow students to get the idea of the mobile application process. Learners will need to know and become familiar with the user interface of MIT App Inventor in order to answer the driving question. I would have students complete the three tutorial applications at their own pace, while showing me their finished product so I can observe and give feedback if needed. For my project, I will allow students to pick their partners. I believe that will be beneficial because students will be able to share ideas, receive programming help, debugging help, help deploying the application to a tablet, and ultimately testing the application.

Phase 3: Describe products learners will create to answer driving question, opportunities for critique and revision, how technology will support learning/student work.

To introduce the unit project, I would plan on setting up an authentic situation. Larner states, “Authenticity is a not so secret sauce that enhances students' engagement in projects. Research has shown that it not only increases motivation but also achievement.” (Larmer, 2015, pg. 40) Also, he makes a point that the project can have an authentic impact on the world. It is one important point that I would like to point out early in the unit. I would go through a technology timeline, or a similar activity, to show how technology has impacted the world and made our lives simpler. One possible scenario for the final application project is to say, “A local computer technology organization is interested in creating a group that teaches people how mobile apps can be used to solve real-life problems that are important to individuals, their families, and their communities. They need your help to create apps that they can use as examples. They want you to use your creativity to design and create a mobile app that solves a problem that is important to you, your family, or your community.” The product learners will need to create will be the finished product of their mobile application. Technology will not only support student work but it will be the driving force of the entire project.

Phase 4: Describe a culminating event where learners will present work and answer driving questions.

Once students complete their application, it is important to consider the size of the class and the class time available for the presentations. Students may use presentation software and formally present the applications to the audience, or they can create poster displays and present

their applications as a gallery walk. I believe the gallery walk is a good idea for students to present their culminating products. Guests could attend their application station and ask questions about their application such as, “What does it do?” , “How does it work?”, “Can I try it out?”. Also, some feedback I received from my group members even proposed having a professional application developer come in for students to present their application to them if they chose to do so.

Phase 5: Describe how you will manage/ facilitate the unit so students make progress & meet goals.

To help see growth or collect formative assessments to show learning before students submit the final application, I would require documentation on flowcharts, algorithms, sketches, and screenshots on drafts of the applications to see how it evolved from an idea to an actual artifact. One idea I received was to have checkpoints, such as when a student gets to a certain point, they would show the teacher what they have done to allow for feedback on their progress. One thing it would help eliminate is if a student completes the entire application, but makes a mistake on a crucial step at the beginning, then they wouldn't need to start from scratch.

Part Two: Technology to support active learning, Barriers, and Teacher Leaders

One major connection I am able to make in how technology is used to support active learning throughout my project comes from Spector, page 69. It pertains to Vygotsky and the cognitive social mediated theory. Spector writes, “Introducing language about things completely alien to someone's prior experience is not likely to be very meaningful unless that language is accompanied with some kind of realistic experience with which the person can relate.” More often than not when I begin a unit of app development in the classroom, it is completely foreign to 95% of students. So when I begin to talk about things like layers of an app, event handlers, procedures, and loops, students have no idea what any of this means unless they can get personal experience with these concepts. Typically I will explain these foreign terms and show them on my end what it looks like. Then we will go through some guided practice or tutorials on what these things are,what they do, and how you can use them. Once students have a grasp of that, I will pose some small scenario where they will have to show me they can do it on their own. Very similar to an “I do, we do, you do” setup. This also connects to chapter sevens section on the zone of proximal development. Spector goes on to state, “The distance between a child's ability to understand a concept or perform a task independently and that child's ability to understand and perform with the assistance of a MKO is called the zone of proximal development.” Ultimately, if we are going to help students through that process, There are a few essential factors that are critical. 1) The presence of someone with the knowledge and skills to guide the learner (teacher). 2)Social interactions that allow the learner to observe and practice their skills (Group collaboration/teamwork). 3) Scaffolding, or supportive activities. All three of these activities you will find present in the PBL experience.

Just like in any aspect of an educators journey, there are going to be barriers we face. One barrier I find myself facing often is technology issues. As a technology/ computer science teacher, I rely heavily on the use of technology. Technology can be an amazing tool if used properly. Spector writes that “technology by itself is neither good nor bad; rather, it is how technology is used that is good or bad.” (Spector, 2016, pg. 4). My PBL experience is focused squarely on the daily use of computers and tablets. With any sort of technology, comes the temptation for distractions. It's almost inevitable that some students will find themselves off task, just based solely on the readily available technology that's in front of them. There are ways to overcome this barrier however. It's important to help students recognize that technology in the classroom has to serve a learning purpose. Actively monitoring student use of the technology is another helpful way to limit the distractions. Walk around the classroom, looking over students’ shoulders to check such things as windows that have been minimized at the bottom of a computer screen. It’s good to trust your students, but they need to know that you expect them to be focused on learning. It's also helpful to have your classroom set up so that you can view screens and maneuver throughout the classroom. One last method would be to assign roles to students in their groups. If everyone has a specific job to do, it’s much easier for students to focus on the learning goal.

Another barrier I find myself facing as a young educator would be my limited experience with PBL. It takes a considerable amount of time to become an effective PBL facilitator. In order to reach that level, you have to start small and work your way up. One way to overcome this barrier would be through professional development opportunities. Herring states on page 265, “ Professional development designers and facilitators should continue to explore ways to immerse

teachers in technology rich learning environments during professional learning experiences (Lawless & Pellegrino, 2007; Polly & Hannafin, 2010). Such professional development should aim to deepen teachers TPACK by providing experiences that allow teachers to develop their knowledge of technology, pedagogy, and connect and attend to the intersections between each of these kinds of knowledge." With more professional development opportunities to see how it can be done, it will provide you with the groundwork to be able to take on such tasks. Ultimately, it comes down to you as an educator being willing to get outside your comfort zone and try something new. You can't be afraid to fail or you will never grow.

There are a number of steps you can take to help peers improve their practice in supporting technology-rich active learning. After reading chapter 15 from Herring, I believe that it starts with school culture. Herring states on page 240, "The success of the school is dependent upon how teachers embrace and implement the opportunities that technology presents to them. They are the most significant stakeholders in terms of technology-related reforms." The climate of the school should be energized and excited to learn. Professional development should not be viewed as a "have to" but as a "get to" if we want to get the most out of it. Staff culture can have a big impact on the way professional learning is viewed and it can have a big impact on school climate too.

I think another way to help peers improve their practice in technology-rich active learning would be through professional development and administration support. It's important to have confidence in yourself but it's equally as important to have support from others. On page 265, Herring states, "For TPACK to be developed in such a way as to be implemented in classrooms, teachers need professional development that is designed at the intersection of the

TPACK framework and learner-centered professional development principles. Teachers need time in professional development to participate in technology rich experiences as learners." And On page 266, Herring said, "...support in the early efforts is critical to success." If the district does not supply you with the proper professional development to give you the keys to success, you will have no idea where to even start and will likely not be willing to even try. Likewise, if you don't have support from peers or administration, it doesn't matter how much confidence you have in yourself, you are set up for failure.

References

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