Review of Literature

Not only is there a physical shift with technology in our world, there is also a mind shift in people as well. Students growing up with technology now learn differently than those did before. They have knowledge at their fingertips and demand fast paced information with even quicker results. With this era being very different than how others were taught before, it is harder for educators to really meet the demands of new technology, but especially the demands a digital native student. If the jobs that educators are trying to train these students for don't even exist yet, how do educators honestly meet the requirements of teaching 21st century skills?

The ACOT (Apple Classrooms of Tomorrow-Today) research went into high schools and tried to create a learning environment for this generation of students. This of course was aimed to teach students the 21st century skills they would need to live in our society. This not only had to do with bringing technology into the curriculum but also the 3 core TPACK skills. TPACK originally started as the PCK, Pedagogical Content Knowledge, addressed the new approach to curriculum in a way that would use pedagogy and content interdependently not separately. As a whole, the research has really revolved around how using these domains together students can transform into critical thinkers and problem solvers while now keeping up with technology which is and will continue to be a huge part of this generation's life.

Theoretical Rationale: Using Technology with Purpose

Apple Classrooms of Tomorrow-Today, was a research collaboration with educators designed to help figure out how to keep students in school during the high school dropout epidemic. "Each year, almost one third of all public high school students – and nearly one half of all blacks, Hispanics and Native Americans – fail to graduate from public high school with their class"(Bridgeland, DiIuluo and Morison, 2006). They claimed that 21st century learning was at the junction of three influences: "globalization, technology innovations, and new research on how people learn" (Baker, Gearhart, Herman, 2008). This program was not only designed to help students be more prepared for the real world and the new demands of jobs, but also to get schools "closer to creating the kind of learning environment this generation of students needs, wants, and expects so they will stay in school"(ACOT²). Not only were educators seeing our

students not being able to meet 21st Century demands, they were also not engaged and not wanting or unwillingly to put in the work. The three phase process that ACOT² developed was designing core principles for 21st Century learning, implement them through technology and then apply them through an intentional project. Schools and districts that did participate, say they have seen an increase in student academics and engagement.

Rein, who was also closely looking at ACOT research, researched what effective integration of technology was and if it makes a difference. ACOT found when technology is used appropriately in the classroom, it can foster the thinking, creativity, and problem solving skills this generation needs. Their researchers found "that teachers progress through a series of stages in their ability to effectively think about and use technology for teaching and learning (Rein, 2000). Obviously the teachers progression through the stages has a detrimental impact on how they use technology in their classroom, transferring to what difference it makes on the student's skills. The stages, called The Evolution of Thought and Practice, were entry, adoption, adaptation, appropriation, and innovation. Although it takes time for teachers to reach the innovation point, the value is very great when they do.

At Harvest Middle School there is a BYOD program with the support of computers to be checked out for free from the library. In the 7th grade class, on a routine day, 100% of students have computers to use 1:1 in the classroom. ACOT theory suggests though that having 1:1 computers isn't enough, students need to use it in conjunction with and to deepen their knowledge of their pedagogy and content. ACOT has a three part learning theory At Harvest it is clear that the shift in pedagogy and content through the IB program curriculum has really transformed the learning culture at the school. But, are teachers who now having 1:1 device compliance in their classrooms utilizing those devices for student engagement and inquiry?

Using Pedagogy, Content, and Knowledge Interdependently

TPACK is a conceptual framework that Mishra and Koehler describe as the knowledge base for teachers to effectively teach with technology (2005). The theory is that the three domains Technology (TK), Pedagogy (PK), and Content (CK) working interdependently together would

teach students 21st century skills while being engaged and meeting their new learning demands. The implications of TPACK are that it is difficult to use these domains interdependently when educators may not be well versed in a particular area. In the past professional development has only focussed on one area but now having to be experts and interplay all three areas, eductors have a lot on their plate. Graham in his research discusses how the domain that really needs to be strengthened in TPACK is the field of educational technology. He claims that it has been difficult to root theories for educational technology "due to rapid technological change (Richey, 1997; Roblyer & Knezek, 2003) Rein also discusses how TPACK has a "hidden complexity; easy to understand at a surface conceptual level" (Rein, 2011). It makes sense if educators are not well versed in one or more of the domains of TPACK, that their could be some major problems when it comes to integrating this into a classroom already filled with obstacles. Harvest MS, has really dedicated its energy towards shifting pedagogy and content to create an authentic learning environment. But now with the introduction of technology and the shift in roles with students (digital natives) and teachers, parents, etc. (digital immigrants), it's hard to evaluate if one is using technology appropriately.

21st Century Skills Students Need

Much research has been developed around what skills this generation needs to be 21st century ready when they graduate and start a career, and why teaching them these skills is so important. In Blair's section Technology Integration Remixed, she talks about the four C's and how application of these skills in a "technology-infused life and workplace, requires them being taught in a technology-infused learning environment" (Blair, 2012). She claims that students need to be immersed in technology and as teachers and parents we need to trust them more, in terms of using in it. They need to be able to explore tools, not be confined to only a couple and then use them to apply their content knowledge. She also talks about how teachers need to shift from "creating presentations to crafting powerful learning activities" (2012). Students are the inquirers, explorers, designers, driven by their own engagement and curiosity. Friesen and Scott in their literature review also agree, claiming that their aim is to teach students 21st century skills through inquiry and discovery. Technology is the obvious route to engagement and deeper discovery for students, but are we truly allowing them to do this in these 1:1 device classrooms?

Summary of Literature

It is obvious that if we integrate TPACK's three domains well, we can seamlessly teach this generation the 21st century skills they will need, but in reality it is not that easy. We saw how learning technology is a process that takes time, but with the rapid change in technology it makes learning very difficult. Educators are trying very hard to do this in their classrooms, and those who are have seen the benefits of doing so through student engagement, inquiry, and collaborative meaningful projects. The need is to find a way to evaluate how well technology is being used within the pedagogy and content in the classroom, to eventually have ways to help educators enhance their practice to meet these 21st century demands.

Research Methodology

In this mixed qualitative and quantitative research project teachers who use technology well in their classes and their students, will be surveyed and observed. Findings are intend to be discussed with the staff and district, in order to help guide other teachers on the road to TPACK mastery. Three teachers will be surveyed on their background with technology and how comfortable they feel integrating it into the classroom. An observation of each teacher in the classroom using technology in a well planned lesson will be the next piece of data collected. After, students will be surveyed anonymously, about the technology use in their classroom, and every 3rd student survey at random will be used in the data. It is apparent that their needs to be a shift in mindsets and curriculum in our country, and Napa Valley Unified District is trying to make that switch. Mishra and Koehler say that only teaching and learning the basics of technology programs "assumes that knowing a technology can automatically lead to good teaching", but as we saw through ACOT and TPACK research we know this is not true. At this school, it is also apparent that the goal is to use laptops in every classroom, but also a wide range of technologies too, in order for students to gain a wide range of skills. Also with the rigor and change of the Common Core Standards, it is necessary that we teach students skills to not only meet those demands, but the demands of their future careers.