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DECONSTRUCTING MYTHS AND CLARIFYING TRUTHS: TEACHING ISLAM IN AN AGE OF MISINFORMATION rachel otty



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The Give Me Shelter Project. Photo courtesy of Sasha Casciato

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Welcome

The Editors

elcome to another issue of UnBoxed! We hope you will enjoy this collection of essays, reflections and reports about passion, purpose and practice in education.

How do we create meaningful, equitable, deeper learning...for our teachers? This is the question that two of our contributors tackle. Celeste Kirsh shares how a specific approach to professional learning has supported and influenced her teaching. Meg Riordan and Emily Klein look at two schools to see how professional development strategies and mindset are transferred into the classroom, and how important it is for teachers to still be learners. As this article observes, although we all want our students to be deeply engaged, resilient, persistent and inquisitive, we sometimes forget that "teachers need help in learning how to do this as well, we forget that 'better teaching' is not instinctive."

Sarah Fine challenges us to break out of our "silos"—those echo chambers that we create for ourselves which work to reenforce our existing beliefs but leave little room for other ideas. Sarah sees much in common and much to be learned between the Dewey and Friere "camps" of educational philosophy. As she says, "there are many things worth learning, and many ways to learn them."

Three of our contributors share their experiences in the classroom. Jen McConnel and Erin Zamborsky share their Romeo and Juliet Project, which involves an updated application of the story, as well as opportunities for students to develop their causal analysis thinking skills in order to "impact students in their lives beyond the classroom." Rachel Otty reflects on the challenge of breaking through misinformation in order to teach religious literacy. And Heather McCreery-Kellert and Sheli O. Smith offer a compelling argument for the use of video games, specifically Minecraft, to create collaborative, engaging, and challenging transdisciplinary problem-based learning experiences for students.

We often talk about student voice and its importance in creating meaingful experiences for our students, and in this issue we are thrilled to include a reflection by high school student Ariana Campos, who shares how the San Diego Sanctuary Project has impacted her and her classmates.

The UnBoxed cards in this issue offer glimpses of projects and practices that we find inspiring. These cards are freely available on our UnBoxed website in a printer-ready format. Simply print, fold, share and discuss. Each card refers the reader to a web address for further information.

We wish to thank the K-12, university and other educators who have reviewed our submissions for this issue and offered invaluable counsel. We invite all of our readers to join us in conversations about teaching, learning, design and leadership by submitting your thoughts for publication or serving as a peer reviewer. To learn more, visit www. hightechhigh.org/unboxed

Our next submissions deadline is Monday, October 9, 2017

Read, enjoy, and participate!

—The Editors



photo provided by Celeste Kirsh

An Edu-nerd's Heaven: Rethinking Professional Development for the 21st Century

Celeste Kirsh The Bishop Strachan School

o say that my first year of teaching was a struggle would be the professional understatement of my career. Perhaps you can relate? If it wasn't the lack of sleep, trying to overcome imposter syndrome, or keeping up with a bottomless inbox, then surely that maniacal photocopier would be the end of me. But these pesky nuisances were nothing compared to the reality of learning how to teach my students in a manner different from what I was taught. The lifesaver tossed to me was a professional development program called Cohort 21 that puts teachers into the role of inquirers and transforms classrooms into laboratories.

When I was growing up, it was completely unheard of to have a teacher use student interest to guide a project or allow a student's questions to drive an inquiry unit. Not surprisingly, the professors who were training me to become a teacher demonstrated more of the same: for the most part they ironically lectured their students on the merits of inquiry education, all while we took notes and then wrote papers in response. It wasn't until I was in my own classroom in an inquiry-based school that I felt the depths of my deficits in this department. To teach in a manner that was so dramatically different from my own education was like trying to write a novel in a language that I was still trying to decode, with my feet, suspended upside down from a tree. Shocking to nobody, I was not alone. Falk and Blumenreich (2005) address this all too common challenge teachers face when they write, "If we as teachers want to be able to help our students rediscover this desire, we ourselves need to relearn how to investigate, inquire, experiment, and explore. Only by experiencing such learning personally can we come to know and appreciate the challenges, fears, risks, and joys that generating and pursuing meaningful questions can bring" (p. 2). But how can teachers be expected to implement meaningful inquiries or in-depth projects, when we have not been exposed to this learning when we were students?

One of the best learning experiences I was exposed to happened in that very vulnerable and formative first year with my own classroom. I joke with my family that the sole reason I became a teacher was to find a way to make a living from learning. So naturally when I heard about a new initiative, Cohort 21, starting in my province's independent school board, I excitedly signed up without fully understanding what I was getting involved with. Little did I know at the time, but this professional development experience would be how I learned how to delve into meaningful inquiry work and in turn, offer this mode of learning to my students. While Cohort 21 is unique to the school board that I belong to (Conference of Independent Schools of Ontario), the good news is that it is completely replicable on a small or grand scale and could be the future of meaningful teacher professional learning.

So what is it? Cohort 21 was started by two educators in Toronto, Justin Medved and Garth Nichols. They saw the same gap in professional learning that I felt in my first year in the trenches and thought they could do more to support rich, authentic teacher learning. As Feiman-Nemster (2012) confirms, "beginning teachers are not finished products and still have much to learn...private unreflective experience does not automatically produce growth. All teachers need to learn throughout their careers; the problem is that schools are not organized to support teacher learning" (p. 10). So Nichols and Medved rounded up about thirty educators from different schools and invited us to meet one early October Saturday morning in a school library. The coffee was flowing and the croissants were still warm (obviously the only way to make sense of an 8:00am start on a Saturday) as we settled into our first "Face to Face (F2F) Meeting." This first session we were taught the basics of a "21st century teacher toolkit" which consisted of Twitter, Wordpress, Diigo, and Google tools (Hangouts, Chrome, Google+, Gmail, Google Docs to start). These tools served as the foundation for our self-driven inquiry through the year, which we called our "Action Plans." We would find like-minded professionals to follow on Twitter and Google+, share and annotate teaching articles using Diigo, and reflect on our practices and findings using our blog. We were in a connected educator's bootcamp and I found myself overwhelmed and out of breath, but my endorphins were firing and I knew that something exciting was happening.

As I fumbled through figuring out what the @ sign does on Twitter and how to change my Wordpress Blog banner to reflect my teaching personality, I seriously wondered how was I going to find the time to Tweet about teaching? I barely had the time to go to the bathroom during the day! But deep breath by deep breath, I navigated these tools and developed some considerable empathy for my own students when they start a new year, a new unit, or learn a new concept. This is so good for me, I realized during that first F2F meeting, because putting myself out of my comfort zone helps me remember what it feels like for my students.

Throughout the year, we met a total of four times. Between F2F sessions, there were informal Twitter Chats, Google Hangouts scheduled, and the expectation to blog about our teaching practice, our observations, questions, challenges, and dilemmas. These observations soon evolved into developing a question that I would explore over the course of the year with my own action research. My students would be my little mice (none were harmed in my experiments, of course), my classroom my lab (but with much better decor), and I would don a (metaphoric) lab coat and study my teaching experience as a researcher. I was in a edu-nerd's heaven!

That first year, my challenges and observations grew into a project about learning how to flip my classroom—a teaching method that asks students to view instructional videos independently, often at home, and come to school to practice the skill in the classroom with teacher support. I saw that it was an epic waste of expertise to use my time during literacy lessons to read out word lists or deliver the same comma lesson eighteen times. So I started pre-recording some lessons and using this as a way to leverage my skills to work with small groups of students, while others were working with the flipped videos. While certainly not groundbreaking, for me, having a question ("how might I use my time with my students more efficiently?"), researching it, and then experimenting with it, actually taught me one model for how to implement an effective inquiry unit.

After that first year, I was hooked and I have come back year after year as a facilitator of this learning experience. I support teachers as they learn Twitter, host Google Hangouts to fine tune action plans, I reflect on my own blog, and I comb through the blogs of fellow teachers, sharing my personal experiences and anecdotes to support their learning. What strikes me year after year of facilitating Cohort 21, is how equally empowering and challenging it is for teachers to learn in this new way. This model of professional development does not believe that all teachers need to learn the same thing at the same time in the same way. Allowing teachers to navigate their own paths actually requires them to ask questions about what is working well in their classrooms and what might they want to change. It gives the power back to educators to allow them to decide what they need to learn in a given year and the tools for how to do that learning. And while teachers are still accountable (we share our findings at the final F2F), our learning outcomes are different and reflect the amount of time, effort, and reflection that we put into our action research. This is certainly not new in terms of how students are learning in 21st century schools, but to experience this as a teacher felt revelatory.

While Cohort 21 is unique, it is also completely replicable. Whether implemented school-wide, across an entire board, or just with a small tribe of committed teachers, the principles of this professional development model could translate to any context, as long as you have questions and an internet connection. Below are a selection of ways that you can replicate, or "make a copy," of Cohort 21 for your own professional development or school context:

How to "Make a Copy" of Cohort 21

• Find your PLN (Professional Learning Network): this network does not need to be based in your school, in your city, or even your country. With Twitter, Google+, and fellow

teacher bloggers, it is beyond easy to round up a handful of keen teachers that are doing work that you are interested in. The best on-demand professional development that I know of is Twitter. I carefully curate who I follow so that almost everyone is Tweeting about education. I find that a quick scroll through my feed each morning is enough to get a few shots of inspiration flowing through my veins with my first cup of coffee. Or you could take it to the next level and participate in a Twitter chat on an education topic that you are passionate about and learn from your fellow teachers around the world in real time. There are many Twitter chats on a variety of educational topics that happen on a regular basis. A basic Google search for "Twitter Chats in Education" can lead you in the right direction. Once you have your chat time and day, simply login to Twitter and follow the appropriate hashtag, respond to the questions posed by the chat moderator, and scroll through the comments from your fellow educators.

- Start a Blog: The act of writing about my teaching forces me • to think more carefully and deeply about what I am doing in my classroom. It was awkward the first few times I started this practice, but the benefit of sharing my findings and challenges with others and getting the ideas and feedback from my fellow teachers far outweighs that awkwardness. Moreover, it's important for our students to see their teachers as fellow learners. Allowing my students and parents to read my blog (http://cohort21.com/ckirsh/) gives them insight into my choices as a teacher and helps them see that writing, inquiry, and research extend far beyond their time as a student. I have actually had my students comment on my blog and discuss it with me in class the next day-they provide me with important insight into how they see these projects unfold, while reading my writing about our work together helps them see me as a reflective adult and gives insight into the why and how of our projects.
- Meet Face to Face with your Tribe: While Cohort 21 is all about the tech-tools, we know that the power of seeing people in real time can't be replaced by Twitter or a blog. While you might not have 30 some odd teachers in your "tribe" like the

folks in Cohort 21, schedule a regular meeting with a few fellow teachers that you are inspired by. Meet for coffee and croissants on a Saturday and watch a few inspiring TED Talks together, discuss an article you read about the profession, or share your questions about your teaching and offer ideas for experimentation. Bryan Goodwin (2009) suggests smaller groups of three are ideal (p. 82). Make this a regular date in your calendar (four times a year, perhaps?) and commit to showing up for each other. A few of my teacher friends, who are not part of Cohort 21, decided that we wanted to see each other more outside of school. So we scheduled a monthly educational documentary viewing. Including wine, dinner, and treats certainly helped motivate us to make time for the learning, while the documentary viewing nourished our intellectual curiosity.

Put on Your Lab Coat: Great teachers are always asking • questions. Begin your year by observing what is going well and what you are challenged by. Personally, using tools like the Design Thinking for Educators Handbook has changed how I think about my inquiry work. The Handbook scaffolds for teachers how to ask questions that begin with "how might I...?" and redesign how we approach or solve our classroom problems. Having a guiding question for my professional learning through year helps to filter the articles I read, the folks I follow, and the PD sessions I attend. Take it to the next level and use your question as the guiding focus for fellow teachers observing your class. Asking observers: "how well does my flipped learning approach engage students?" or "how could I better manage these small groups?" or "what classroom management strategies could work best when I'm not the centre of my students' attention?" leverages the vast expertise already surrounding you in your school.

As I experienced in my first year of teaching, there is little time in our professional lives to take a bathroom break, let alone hone our ability to teach in an unfamiliar style. We know how pivotal it is for students to allow their own questions, passions, and interests to guide their learning. In order for teachers to effectively implement a projectbased or inquiry-based pedagogy, "we ourselves need to relearn how to investigate, inquire, experiment, and explore" (Falk and Blumenreich, 2005, p.2). While the Cohort 21 model was the door opener for me, in this new open-source world, the principles of this professional development experience can without a doubt, be copied and borrowed for any teacher's learning.

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photo provided by Jen McConnel

"Thou Talk'st of Nothing": A Contemporary Teaching of Romeo and Juliet

Jen McConnel and Erin Zamborsky Voyager Academy High School, Durham NC

n today's media-saturated society, it can sometimes feel like a sisyphean feat to engage students in history and classic literature. The humanities and liberal arts are regularly seen as less "real world" than other more practically applicable subjects like STEM courses, which serve as a springboard into the various technological and scientific professions. Without the humanities, however, students are poorly prepared to think critically and to engage with the diversity of their daily experiences both in and outside of the classroom, and a core component of humanities education at the secondary level is the work of William Shakespeare.

Many teachers have approached Shakespeare's plays through a historic lens, focusing on Tudor and Elizabethan England while delving into the murky world of comedies, tragedies, and problematic history plays, but we believe there is another approach to joining the English and History curriculums to create a cross-curricular unit that also engages students on questions regarding the value of the humanities curriculum itself.

Project Based Learning

Our approach relies on the Project Based Learning model, or PBL, which emphasizes the importance of questioning and student inquiry to shape each unit. "PBL projects are focused on questions or problems that "drive" students to encounter (and struggle with) the central concepts and principles of a discipline" (Thomas 1). In this case, the driving question we posed to ninth graders before delving into a study of the middle ages, the Renaissance, and Romeo and Juliet was this: what is the contemporary relevance of history and classic literature? Starting from this question, we built a multifaceted project, including more traditional teaching tools like study guides and regular quizzes, alongside creative explorations, including a modernization activity and, finally, the culminating event: a curated "museum" exhibit demonstrating the ways in which students were able to make contemporary meaning out of the history and literature at the center of this project. In all, this project was an excellent example of the principles behind PBL: "centrality, driving question, constructive investigations, autonomy, and realism" (Thomas 3). Students at all levels connect more deeply with classroom instruction when they are given ample opportunity to take ownership of the direction of their inquiry, and although PBL may feel more real-world in STEM courses, the application of abstract driving questions that provide students unlimited possible ways to approach the topic fit neatly in the humanities curriculum, allowing students to personalize their learning and to (hopefully) think deeply about topics beyond history and literature. Throughout the project, students engaged with this question in a variety of ways, working toward a deeper perspective on not only the material conveyed in this unit, but on the selection and inclusion of literary texts in the educational canon, as well. Working collaboratively as educators, we were able to deepen our own understanding of our individual subject areas, while at the same time gaining the opportunity to experience exceptional growth and transformation at the subject, grade, school, and community levels.

The Background

As individual classroom teachers, we have worked to align the English and World History curriculums so that, more often than not, we can come together to offer students additional viewpoints and opportunities to engage with material across the curriculum. We've teamed George Orwell's allegory Animal Farm with a unit on the World Wars and the Russian Revolution, and we've paired The Odyssev with an extensive unit on ancient civilizations, exploring the expectations for heroes in a variety of cultures. The Romeo and Juliet unit, however, was probably the most effective project we planned and implemented during our first year teaching together. In order to create your own crosscurricular humanities projects, consider, as we did, taking a thematic approach. While some texts and eras seem to pair naturally (such as those mentioned above), with a bit of abstract thinking, a willing teaching partner, and time to brainstorm, you will find that thematic issues in literature can easily be applied to all aspects of the Social Studies curriculum, regardless of grade level. Additionally, since the in-depth understanding of theme is a core standard for Language Arts instruction, a thematic approach to unit design establishes connections that can help students deepen their understanding of theme while at the same time exploring the many ways the humanities interconnect.

Since a thematic approach was key to us, this is where we began planning our project. First, we sat down and identified thematic connections between Romeo and Juliet and roughly a thousand years of European history, starting with the fall of Rome and ending with Martin Luther and the rise of humanism. Act I serves as an introduction to the characters and the growing conflict of the play, which parallels the fall of Rome and the growing conflict in Christian Europe. Since Act II is most famous for the balcony scene and the joyful planning that goes into the secret wedding, we chose to connect it to the reign of Charlemagne, the relative calm before the storm of the Crusades, which we linked to the violent and traumatic escalation of events in Act III. Act IV, where complicated secrets are born, felt like a good match for the Renaissance. The tragic culmination of Act V paired well with Martin Luther, Henry Tudor, and the dissolution of the English Catholic church.

Once we had made these connections, we crafted study guides which mirrored each other in length, requirement, and even the questioning stems we used to craft the questions. Focusing on increasing Depth of Knowledge (DOK) as we moved through the project, we began with eight question stems for the Act I portion of the study guide that targeted recall and skill/concept application. As we moved through the study guide, the questioning stems we used became more abstract, leading students through strategic thinking and finally into extended thinking skills, asking them to critique, synthesize, and make connections that expanded beyond their study of the course materials. Additionally, we emphasized the connections between events both historically and in the play, asking students to focus on identifying the chain of cause and effect relationships between major events. More than just a component of solid Language Arts instruction, guiding students to a nuanced understanding of cause and effect across the disciplines will not only strengthen curricular knowledge, but can also impact students in their lives beyond the classroom, since every choice an individual makes naturally has consequences and causes. Teaching cause and effect allows students to go beyond questions of "what" and really begin to delve into questions of "why," which, in our experience, strengthens overall student understanding and connection with the subject matter. One student chose to go beyond the cause and effect chart we asked for, adding a second chart to her study guide to identify which character(s) could be culpable for the tragic events of the story:

The Blame Game— a few examples

- Because Benvolio and Mercutio convince Romeo to go the party...Romeo sees Juliet.
- Because Lord Capulet doesn't stop Romeo from being at the party....Romeo and Juliet meet for the first time.
- Because Romeo doesn't go home after the party....He finds Juliet and learns that she loves him.
- Because Juliet says she loves Romeo....Juliet proposes marriage.

(Student Sample 2016)

Another open-ended question students responded to in the study guide was: What possible events could have prevented the tragic ending of scene 3?

There were several turning points where the events of Act 5 Scene 3 could have been prevented. Even if Romeo and Juliet were still going to go with Friar Lawrence's plan, there was room for improvement. First, Capulet moved up the wedding, which made the timeline for the potion get messed up. Then, Balthasar gave false information to Romeo, which caused his eventual death. If Capulet hadn't moved up the wedding, then the Friars may have had enough time to get knowledge of the plan to Romeo, and then it wouldn't have mattered what Balthasar said. Also, if Friar Lawrence had stayed at the tomb when Juliet woke up, instead of running away like a fool, he may have been able to save her life.

(Student Sample 2016)

Although allowing students to engage in the abstract, hypothetical realm of "what if" may feel a bit off-task, we have found that students provide an interesting perspective when they are encouraged to think in this way, and the conversations surrounding such "what if" questions are often the most lively. As with a deeper exploration of cause and effect, there is a place for hypothetical questioning in all classrooms at all levels, and "what ifs" can easily be incorporated alongside the "facts" or accepted interpretation of a text or historical situation.

In addition to exploring cause and effect and giving students an opportunity to hypothesize about places where the text and the history could have been altered by specific events, we continued to reinforce the connection to the driving question, encouraging students to seek contemporary meaning in a variety of ways. In World History, for example, the students' study guides asked them to reflect on how the Renaissance can be seen as a transition period.

During the Renaissance, a lot of changes happened in art, architecture, and philosophy. It was kind of a bridge from the Middle Ages to modern history. Politics, science, and others were also affected. Styles of painting (oil painting, perspective, foreshortening), Medici family allows painters to get paid, paintings aren't all the way focused on the church. Humanism changes the way people think as well.

(Student Sample 2016)

Such open-ended exploration can, admittedly, offer less motivated students an opportunity to detach from learning, but in our experience, the majority of the students dove into these questions with enthusiasm, and our classroom discussions were greatly enriched for all students based on the variety of answers the study guide invited.

The Product(s)

Although students generated a variety of work for this project, the culminating product is, to our minds, the real star of this endeavor. Inspired by a lesson plan constructed by Traci Gardner for ReadWriteThink.org and by the fact that the Folger copy of Shakespeare's First Folio is currently touring the United States (and appeared in the capital city of North Carolina, less than thirty miles away from our school, as we wrapped up this project), we decided to push students (and ourselves) outside of the comfort of classroombased assessment, and we developed a final product within a wider community context. Keeping in mind the guiding PBL principles of student voice and choice, we gave students the opportunity to select their groupmates, under the parameters that no group would be larger than five people, and no group would be smaller than two. Once groups were determined, we asked students to pick an act for the project. They could choose based on the content of the act in English or World History, but whichever act they selected, they would then be responsible for becoming experts on the content of that act for both classes. We then modified Gardner's idea of contemporary interpretations of Romeo and Juliet by emphasizing written forms, such as blog entries, text messages, playlists, and scripts, and we expanded Gardner's original instructions so that each group was responsible for creating ten documents (five for history and five for English) modernizing their act in whichever medium they choose.

Students took this idea and ran with it. Stellar student examples included newspaper articles written in the vein of a Hollywood gossip column discussing the intrigue and insanity of both Romeo and Juliet and the corresponding historical era, filmed newscasts that had us "Keeping Up With the Capulets," and a slew of text messages which made Romeo, Juliet, Charlemagne, and Martin Luther suddenly seem like modern teenagers who would not be out of place in the halls of any high school. As Robert Probst points out in his 1988 article "Dialogue with a Text," "if meaning is a human act rather than a footlocker full of dusty facts, then we must focus attention on the act of making meaning rather than simply on the accumulation of data" (38). By undertaking this project, students made deeper connections with the history and literature than if we had simply asked them to complete the study guide and quizzes, creating a final product that demonstrated not only understanding, but ownership. Ultimately, students completed this work, formatted and mounted their finished products, and, over the course of one afternoon, transformed a classroom into a miniature museum exhibit. Such "translating" can easily find a place in your curriculum, allowing students to engage on a personal level with subject matter by creating a modern derivative inspired by the text or information. Additionally, the final gallery product can easily be modified and replicated to suit your curriculum. Ideas for other gallery-style presentations we have employed or have seen our colleagues use include three-dimensional art inspired by works of poetry; science-inspired art put on display; and, my favorite, works of two-or-three dimensional visual art and an accompanying artist's statement allowing students to engage with a driving question in any way they wish, as long as they are able to articulate the choices they made and the motivation behind their art.

Once students created their modernized products for their gallery, we guided them through the relatively simple process of transforming the classroom coupled with the more complicated process of preparing to serve as tour guides and project specialists. The tour guides were responsible for understanding the overarching themes and concepts of the entire project, and as part of this responsibility, students prepared talking points to assist them in guiding small groups of community members through the exhibit. Parents, other students, and teachers were all invited to attend the exhibit, and student tour guides and project specialists engaged all guests with a sense of accomplishment. Students who undertook the role of project specialist were expected to develop comprehensive knowledge of their group's act and product, and prepare an explanation for the day of the tour; project specialists remained beside their groups' product during the tours, and interacted with community members, answering specific questions and offering a deeper look at the overall project. Both tour guides and project specialists worked to answer the driving question, "what is the contemporary relevance of history and classic literature?" within their talking points and during their tours. Oral presentation, both formal and informal, is an important skill students must master, and this project allowed students to experience a presentation more dynamic, individualized, and unpredictable than the usual assignment of delivering a speech or slide presentation to their peers; students had no idea who they would be asked to tour and speak to, but they knew their presentation formed a part of their project grade. Despite nerves, students rose to the challenge admirably, even conquering the daunting task of guiding members of the school administration team through the exhibit with poise and confidence that truly impressed their guests.

On the day of the exhibit, over two hundred students, parents, teachers, and other school community members received student-guided tours. Other than providing the framework for the schedule and the tour groups, we stepped back and allowed students to run the entire event, including ticket distribution, tours, and collecting evaluations from guests after the completion of the tours. The results went above and beyond our expectations, and were well worth the fear that came with handing over the responsibility of such a public demonstration of learning to a group of one hundred 9th graders. Feedback from guests consistently ranked the students high in terms of expertise and maturity, and student feedback affirmed that, although challenging, the learning experience of this project was one many students valued:

I think that yes, Romeo and Juliet should be kept in the high school curriculum. I liked this unit a lot, and I think that it's thought-provoking and interesting. I think that reading the play itself gives students an opportunity to develop important thinking and interpretation skills. Not only that, but many lessons can be taken from the story. We can look for themes such as loyalty/family ties, love vs. hate, how acting before thinking about consequences is a bad idea, etc. Plus, it's a good chance to look at Elizabethan writing. Reading Romeo and Juliet has a lot of benefits, so I think that it should be taught in high school classrooms (Student Sample 2016).

I liked this unit a lot. I thought it was very interesting to read the play, Romeo and Juliet, and learning about the historical components was interesting as well. I even thought that the study guides were a good idea, since they gave me an extra opportunity to collect my thoughts about the play and the history

(Student Sample 2016).

Overall, we were impressed and pleased with the quality of student work generated during this project. Despite teaching in a PBL-focused school, this endeavor was the first time we had come together in such a public way since we began collaborating, and in many ways, it felt like

a trial by fire for both of us in terms of our understanding of and comfort with the PBL model. At the end of the day, this project reinforced our belief in the value of Project Based Learning, particularly because we were able to see students making real, meaningful connections across the curriculum and beyond the classroom, engaging their peers and parents in a powerful way. Taking a risk by staging such a public presentation of student knowledge paid off in a big way, and after completing this project, we have both been more adventurous and abstract in our teaching. This unit cemented our relationship as teaching partners, and strengthened our mutual commitment to providing students ample opportunity to step outside their comfort zones and engage in intentional educational risk taking. When students ask which project is our favorite, we inevitably tell them this one, and we will continue to utilize this project again in the future. Although we will make minor adjustments moving forward, as will be discussed in more detail in the next section, the core of this project was incredibly strong and other teachers could easily build upon the ideas we've presented to create their own meaningful cross curricular projects, drawing on Romeo and Juliet, or incorporating other canonical texts and eras of history. Taking a risk in our own teaching and encouraging students to take similar risks yielded powerful, memorable results, and although it can be a scary proposition to teach outside of your comfort zone, we believe the results are worth it.

The Aftermath

Throughout the project, students participated in online discussion forums via Canvas, our school's CMS. When offered the Driving Question of the unit, what is the relevance of history and classic literature to contemporary life?, one student answered:

This is an interesting question. In my opinion, history and classic literature are still relevant in our lives today, but partially because we make them relevant. I probably wouldn't go out of my way to read Romeo and Juliet if we weren't reading it for school. I think that classic works are definitely things we can learn from, and particularly to learn about history during whatever time period they were written. We are doing this right now by reading the play as we learn about the time period in World History. History is definitely a little more relevant in contemporary life, at least in my opinion, since history is what our life today is built off of. And in that sense, I guess classic literature is part of history too, therefore making it a building block for contemporary writing. The word "relevant" makes it a little tricky though. It doesn't really seem like classic literature is really relevant in our lives. What do you guys think? Like I said before, I think a lot of times we make things applicable to ourselves.

(Student Sample 2016, emphasis added)

By extending the conversation out of the classroom and into the online learning environment, students were able to interact with peers in different class sections, broadening their understanding of the driving question and the material covered in both English and World History as part of this unit. Creatively and intentionally incorporating your own CMS or other Web 2.0 tools such as Wikis, blogs, and podcasts is a great way to allow students to embrace their tech-savvy in an intentional way, while also fostering cross-curricular and cross-classroom collaboration by allowing students to extend their conversations beyond the specific class period into asynchronous, virtual space.

Conclusion

In fifteen combined years of teaching experience, we can safely say that we have never seen such an engaged response from so many of our students on any single project or assignment we have implemented in the past. The combination of cross-curricular collaboration, the mirrored expectations and guidelines, and the public presentation element are all things that made this project succeed. In short, it was a stellar example of the Project Based Learning model, and a project we continue to be proud of. Next semester, we are planning to adapt the project toward a more abstract, artistic focus by pairing the play with a history unit on revolutionary movements and shifting the question so that student will focus on the unforeseen effects of rebellion. However, the core of the project will remain the integrated focus between world history and English, and we will continue to offer students opportunities to make connections between courses and their lives. Additionally, the structure of this cross-curricular unit can easily be replicated, modified, and expanded to accommodate humanities pairings at all grade levels, and the inclusion of STEM courses in a project of this nature can also be achieved through ingenuity, abstract thinking, and, of course, an understanding of thematic connections across the curriculum.

As demonstrated through this project, student engagement and achievement excel when students are given the opportunity to make connections between the material of the traditional classroom and the world outside their school. If we truly want to prepare our students to face the ever-changing demands of the 21st century, it is vital that we help them make meaning that goes beyond the curriculum, and reinterpreting canonical literature and the events of history can aid in this process, if approached creatively and collaboratively.

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photo provided by Meg Riordan

What Does It Take to Teach for Deeper Learning and Equity?

Meg Riordan and Emily Klein EL Education and Montclair State University

n classrooms across the United States, many of our most struggling learners experience instruction best described as what Martin Haberman (1991) calls, "the pedagogy of poverty," where pedagogical practices tend more towards giving information and controlling behavior than creating spaces where students identify questions, make meaning, and solve problems in their communities and the world. Many teachers are ill-prepared by teacher education programs or professional learning opportunities to change the pedagogy of poverty observed in so many schools, and often teachers' own schooling experiences reflected this kind of instruction. Teachers then frequently experience professional development that affirms such instruction, with facilitation that fails to support them as engaged, curious, autonomous professionals.

As a result of this "pedagogy of poverty," learners that are most underserved—students of color, immigrants and English Language Learners, low-income students, and those receiving Special Education services—often spend class time filling out worksheets, which promotes high compliance but low engagement, inquiry, critical thinking, or creation of new ideas (Noguera, Darling-Hammond, & Friedlaender, 2015; Friedlaender et. al., 2007; Kohn, 2011). They are denied deeper learning opportunities, which we define as those that provide support in not only mastery of rich skills and content, but also the ability to think critically, collaborate, communicate effectively, self-direct learning, and believe in oneself. Instead, our students of color and others marginalized by income, language, or ability experience diminished opportunities anchored in illiteracy, lack of self-efficacy, low engagement, hopelessness, and criminalization (National Center on Education and the Economy; 2007; Children's Defense Fund; 2007; Noguera, Darling-Hammond, & Friedlaender, 2015). At a time in our world when college and deeper learning skills are critical for participation in society and the global economy, far too many underserved students struggle within classrooms and schools that reinforce low-expectations and inequity.

What, then, can educators do to dismantle inequity and the "pedagogy of poverty" in classrooms and schools? How can leaders and teachers support deeper learning and equity for all learners? If, to paraphrase Maya Angelou, "when we know better, we must do better," what do educators need to know in order to "do better?"

The authors set out to study two urban schools in New York City that seemed to be "doing better" in order to figure out how they are helping teachers create equitable spaces for deeper learning for all students. We think of equitable spaces as those where all learners have multiple points of access to rich content as well as tools to support their success in developing the deeper learning skills defined above. Equitable spaces also incorporate the kinds of social justice curriculum that Freire (2000) refers to as, "problem posing pedagogy," pedagogy that attempts to liberate and transform. When looking for these schools, we turned to respected colleagues and educators in the field who pointed us in the direction of schools that were grappling with designing learning experiences for deeper learning and equity. We then spent the fall and winter of 2017 trying to understand their professional learning experiences, the kinds of curriculum and instruction teachers were constructing and enacting, as well as the experiences of students. We observed classes, talked to teachers and leaders, spent time observing the range of professional learning experiences, and engaged in focus groups with students about how they saw issues of equity

and deeper learning in their classrooms. After months of observing, talking, reading, and analyzing, we started to notice trends across both schools that seem to have implications for many. It is worth noting that this is a small scale study and that in opting to look deeply at two schools identified as successful models of teaching for deeper learning, we hoped to draw upon their work to create a framework for understanding professional learning for equity. It is our further hope that future studies will attempt to apply this framework and examine a wider variety of schools.

We wondered if professional development looked "different" when it focused on supporting students' deeper learning and equity. We knew that prior research had identified the major components of good professional development: 1) is extended over time, 2) provides teachers with collaborative opportunities for active learning, and 3) is relevant to classroom practice (Desimone, Porter, Garet, Yoon, & Birman, 2002; Desimone, Smith, & Phillips, 2013; Garet, Porter, Desimone, Birman, & Yoon, 2001; Lieberman & Mace, 2008; Opfer & Pedder, 2011). But we noticed additional features that spanned these two schools which suggest that professional development for deeper learning and equity needed something more to be effective. In both cases we noticed that teachers had experiences during professional development which mirrored what they then were expected and able to create and enact with their students. This shouldn't surprise us as we know that it is often our own practice (rather than research) that informs what we do in our classrooms. We do what we know.

In the end, we identified three features of professional learning that matter if teachers are to know and do better to support all students' deeper learning and equity: 1) content, 2) design (instructional strategies and mindsets) and 3) ownership.

Content: It Matters What Professional Learning Is About

Part of what makes schooling equitable for students is providing opportunities to explore issues of equity in the world around them. No matter how rich the learning is, if it doesn't help students to answer pressing questions about their community, lives, or the world around them, then it doesn't truly empower them to enact change in themselves and outside of the classroom. In order for teachers to do this kind of work, they also need opportunities to think about the kinds of curriculum and pedagogy that support students in this kind of critical "reading" of the world. The teachers we observed spoke of powerful professional development steeped in learning "about compelling topics" and then "doing fieldwork" or "interviewing experts" to build their content knowledge and skills. Teachers were engaged when the content was relevant, open-ended to encourage grappling with tough issues, and invited multiple perspectives. They highlighted content focused on historical events, such as the 1863 Civil War Draft Riots in New York City and the Gulf of Tonkin incident; others named science-based explorations of "green" buildings and genetic testing. One teacher expressed, "Our professional learning is about learning and learning by doing and it's that mindset that we want our kids to have. We want them to have an experience, learn, and reflect. It's the pedagogy that we believe in and as teachers have had the chance to experience."

Transferring her professional learning to the classroom, this teacher then engaged her eighth- graders in a case study titled, "Fight For our Rights," exploring San Francisco 49er's quarterback Colin Kaepernick's decision to kneel—rather than stand (as is tradition) during the national anthem. Her students were invited into the content to "take a stand" by reading texts and articles that provide multiple perspectives on this issue. During one researcher's classroom observation, students participated in a Socratic Seminar guided by this question: "Some people suggest that Colin Kaepernick should be fired. Should he? Why or why not?" This content, these questions, engaged learners in genuine inquiry into fairness, racism, and inequity, as evidenced in the following dialogue from the Socratic Seminar:

"In the article, the journalist said, 'players are encouraged, not required' to stand up during the national anthem."

"I agree. My article said that, 'As an American citizen, Colin Kaepernick has the right not to stand.' He shouldn't be rebuked. Also, he tried to make his protest less offensive by taking a knee instead of sitting."

"I also agree. The league can't legally fire him because standing is not required. I want to also add on that Colin Kaepernick is allowed to express an opinion; he's not under orders or confined to act differently because of his role on the team. However, as a black man, he might be perceived as more outspoken or out of line because of his actions. That's what my article indicated."

"I respectfully disagree. His actions don't support his commitment to his team or to the national anthem, or the country."

"I respectfully disagree. As citizens we have the right to say whatever we want. And as an African American, he has the responsibility to speak—or show—his opinion."

The teacher interrupted: "Let's pause. Where does the right to speak or say what we want stop? Can someone give an example of someone exercising the right to speak that has been limited by law?" The teacher's own experiences in professional learning that engaged her in authentic questions and used structures to support investigation into these questions (we say more about this next), allowed her to transfer this experience to her classroom. Her experience of "doing better" and learning effectively through her school's professional development became the basis for her students' experiences of learning deeply through content that sparks questions around equity.

Design: Content Matters, But So Does Pedagogy

We know from Dewey and the long line of educators addressing democracy in the classroom, that to create democratic, equitable classrooms, students need pedagogy that models democratic ways of being. Beyond just following directions, memorizing, and regurgitating information, structures that support deeper learning are essential. We identified a series of practices that teachers at these schools used to help support democratic classrooms, that we propose are foundational for deeper learning and equity:

- clear learning targets and ongoing checks for understanding, protocols to guide equitable discussion,
- a balance of collaborative and independent learning,
- peer critique and feedback on emerging work,
- developing academic vocabulary embedded in texts students are reading (as opposed to stand alone memorization),
- Socratic Seminars, sentence starters and stems that support collaborative discourse between students.

We believe they are foundational because our data collection demonstrated their power in supporting all students in accessing and engaging with rigorous content. To support growth mindset in the classroom, students needed chances for revision, targeted reading strategies to access complex text, and multiple opportunities to demonstrate learning and progress. And they needed to know that the classroom is a safe place to try, and that practicing is a part of the learning process.

Additionally, teachers needed professional learning that modeled and explicitly taught these kinds of structures and mindsets, as well as engaged them in frequent practice that helped them learn how to do this. For example, at one of the two schools where we observed, each teacher's professional learning opportunity, from grade-level team meetings to inquiry group meetings to department meetings, started with an "ice breaker" activity (to build trust or learn about their colleagues), followed by a protocol for engaging deeply in a question of practice, involved individual and collaborative writing and discussion, and concluded with reflection or debrief. In a number of professional development sessions all teachers took notes and did their writing in a Google document that allowed them to co-construct and document their learning. This structure was the kind that supports deeper learning as well as equity: it supported collaboration and self-directed learning, as well demonstrated attention to ensuring that everyone's voice was included in that co-construction. What became evident over time was that teachers were not just exposed to instructional strategies for deeper learning and equity, but that those strategies were ingrained routines in their own learning that therefore became natural to transfer to their classrooms. Teachers learned to "do better" by experiencing it, appropriating and practicing it, and applying it to their own practice to support all learners.

Ownership: Who Decides What Teachers and Students Should Learn?

While the literature is replete with admonitions for educators to ensure that teachers and students own their learning, schools are filled with examples of teachers and students engaged in worksheets, prescribed curriculum, and teachers asking questions that have little to do with students' own contexts, problems, and social/political challenges. Just as students need opportunities to grapple with the real structural inequities that they experience around race, class, gender, ability, language, class, or religion—teachers need professional learning that is built around their burning questions of classroom practice.

In both schools we found deliberate and relentless attention to supporting teachers in being leaders in their own practice. In one instance the principal told us that in the first few years of the school's launch, teachers simply pushed back on externally driven professional development that focused on administrative concerns rather than teacher questions. In the end, the school moved more intentionally towards professional learning that was teacher owned and led. While that did not mean the abandonment of outside expertise that helped drive the school's goals and mission, it was done in tight alignment with teacher driven inquiry. There were three facets to ownership that emerged as particularly important:

- Teachers need autonomy in creating curriculum that is responsive to students' needs, issues, and questions.
- Teachers need to engage with other teachers in inquiry groups that are teacher led and driven, to engage in activities similar to those they expect students to experience. They need to ask questions, design ways of learning about those questions, explore and test their assumptions, and share their learning with others.
- Teachers need to receive feedback and coaching that is specific to their needs, rather than a large scale professional development with generic materials for all classrooms. Professional learning for adults needs to honor different needs. For instance, one school coach described her work with teachers in this way:

The role of instructional coaching for us is a leverage point it's a challenge because it's individualized...it's really personal. It's shifting the way that we as adults learn. I'm helping one teacher to engage students and shift her mindset so that students drive the learning. She's creating a case study on Flint, Michigan's water quality and students are advocating for people in need and using science to do that.

Through targeted coaching to meet an individual teacher's needs, students are encouraged to have a voice in their learning—to identify questions that emerge, to consider how to investigate the water crisis as well as issues of race or class, and to determine how to advocate for those impacted. In this instance, coaching supports this teacher by helping her to invite genuine student inquiry and promote deeper learning, thus providing learners with a voice in exploring the content.

We all want our students to be engaged deeply in their learning, using academic language and discourse and persisting through challenging texts and ideas in order to make sense of the most pressing questions in the world. But we forget that teachers need help in learning how to do this as well; we forget that "better" teaching is not instinctive, and the best curriculum and materials cannot supplement the autonomous professional practice of teachers. Instead, teachers need targeted professional learning experiences that support them both in terms of content and pedagogy that models equitable practice, and also empowers them to ask their own questions in order to empower their students. In this way, we can better equip teachers to support all students, especially our most underserved, in deeper learning that promotes equity.

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Why Dewey Needs Freire: A Call for Critical Deeper Learning

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o many silos. In the darkness and confusion of these post-election days, this is one of the themes that has gained traction. While the particulars of the argument are contested, the essence is clear: silos are a pervasive feature of modern American life, and if there is any hope of addressing the ever-deepening fault lines of geography, demography, and political orientation, we must seek to break out of them.

I don't know yet what this means in terms of my personal choices. What I do know, however, is that the particular corner of the professional world that I call home—the world of scholars and practitioners committed to spreading "deeper learning" in K-12 schools—is as siloed as any other. We hold our own conferences, publish our own white papers, focus our improvement efforts on our own school-networks, and look to our own set of institutional gatekeepers for validation and support. Rarely do we make serious efforts to engage in sustained conversations with those whose perspectives do not complement or align with our own. In short, we are an echo-chamber. I'm starting to see this as a real problem.

The particular pattern of siloing that I would like to discuss here is the division which separates those of us who define ourselves as "deeper learning people" from our colleagues and counterparts who define themselves as "critical pedagogy people." I've come to think of this as the Dewey-Freire divide.

Before I get any further, let me take a stab at summarizing the characteristics of each group.

On the one hand, in the world of those who read and contribute to blogs such as *Education Week*, you have folks whose work is anchored in a neo-Deweyian vision of progressive education. Accordingly, when we think about teaching and learning, we ask questions such as: Are students consistently engaging in sustained inquiry? Are there opportunities for them to practice "21st century skills" such as communication, collaboration, and interdisciplinary problem-solving? Does their academic work connect in meaningful ways to the world outside of school walls? Leading the charge are institutional actors such as the Hewlett Foundation, scholars such as my collaborator and mentor Jal Mehta, and project-based school networks such as Expeditionary Learning and High Tech High. As Jal discussed on *Education Week* last year, many of the key actors in this world are White. I might add that many are also men.

Elsewhere, in the world of critical pedagogy, you have those whose work is anchored in the work of Brazilian philosopher-educator Paulo Freire. Broadly speaking, Freire's vision insists that learners must be supported in learning to identify, critique, and resist patterns of oppression and structural inequality. Accordingly, when critical pedagogy folks think about teaching and learning, they ask questions such as: Are the histories and perspectives of historically marginalized groups reflected in the curriculum? Are questions about racism, classism, patriarchy, and other "isms" an explicit part of the content with which students are asked to grapple? Are students learning to see, critique, and resist power dynamics which contribute to the continued oppression of themselves and others? Leading the charge on this work are scholar-activists such as Jeff Duncan-Andrade and Ernest Morrell, as well as institutions such as the University of San Francisco, which is working to reimagine teacher education as a space of Freirian praxis. Many of the key actors here are people of color.

These two worlds share plenty of common ground. Both seek to disrupt patterns of institutional and pedagogical authoritarianism. Both emphasize that students—all students—have enormous and toooften-untapped capacities for critical and creative thinking. Both are striving to create classrooms and schools which are fundamentally humanizing places.

From the critical pedagogy perspective, however, we in the deeper learning world are missing something important.

Here's the problem, as best as I can articulate it: the movement for deeper learning, as it currently stands, does not foreground issues of oppression and structural inequality. It focuses instead on a set of cognitive and social competencies which, while necessary, are not sufficient to support students in becoming the kinds of change-agents, activists, and upstanders that our society so desperately needs.

For example, it is entirely possible for students to master competencies such as collaboration and communication without ever using such competencies to challenge politically and/or culturally hegemonic views. Similarly, students might spend years practicing "higher-order" skills such as analysis, synthesis, and creation, without ever bringing these skills to bear on questions of racism, classism, misogyny, homophobia, ableism, white supremacy, and so on. (Joe Kincheloe, a scholar who devoted his career to the work of critical theory and critical pedagogy, referred to this as "un-critical critical thinking.") Such omissions are enormously problematic if you believe that one of the core goals of schooling should be to help students learn to resist and disrupt patterns of institutionalized oppression.

I believe that we can learn a lot from this perspective, not only at the level of theory but also at the level of practice.

I'm thinking, for example, of a project which recently wrapped up at a school that is part of Hewlett's Deeper Learning network. (I've changed the details a bit in order to keep it anonymous.) In the project, titled "Skin in the Game," a group of racially and socioeconomically diverse ninth-grade students spent several months developing and marketing their own brand of natural sunscreen. First, they learned foundational chemistry concepts and played around with different formulations for the product. Once they had come up with a version that they felt to be adequate, they worked together to summarize the research on physical versus chemical sunscreens, create promotional materials, build a website, and set up a booth at a local farmers' market. Finally, students wrote essays in which they reflected on what they had learned about themselves, the science of sunscreen, and the nature of entrepreneurship.

From the perspective of deeper learning as we currently have defined it, this project represents a stunning success. Students had to master academic content and leverage their content knowledge into an act of production; they had to practice both written and oral persuasion; they had to communicate with each other as well as with audiences beyond school walls; and they had to synthesize and reflect on their learning. They even had a chance to try their hand at web design.

From the perspective of critical theory and critical pedagogy, all of this is good, but there are other important questions which need to be addressed. Was the project deliberately framed in terms of challenging socialized notions of who can participate in the domains of science and entrepreneurship? Were students given opportunities to think about the ways in which racism, classism, and patriarchy have shaped and continue to shape—the nature of successful startups in American society? What about the racial dimensions of the product itself, given that sunscreens rarely are marketed to people of color? And, finally, what about the project's tacit endorsement of free-market capitalism?

I'm sure that my colleagues in the critical pedagogy world could pose sharper questions than these, but hopefully I've captured the gist of how they might critique the project.

Perhaps the critical pedagogy folks could learn something from us, too. A deeper-learning-world friend of mine recently joined the humanities department of an urban high school which is committed to teaching critical perspectives. To this end, the curriculum is carefully curated to attend to issues of racism and classism, and to foreground the history of marginalized populations. My friend is energized by these commitments, but coming from a project-based school, he finds the form of the tasks that students are asked to complete to be limiting. As he sees it, the content of the curriculum is powerful, but the read-think-discuss-write format which serves as the department's default instructional routine does not provide students with authentic opportunities to leverage their knowledge into acts of creativity or activism. For example, reflecting on a unit about Native Americans, he wrote: "We were able to make the kids feel pretty shitty about the experiences of Native Americans throughout the 18th and 19th centuries.... but they were never engaged in learning, let alone practicing, what to do when injustices like Standing Rock happen."

Don't get me wrong: no classroom can be all things at all times. Teachers balance an enormous array of competing commitments, and it is as unreasonable to expect that they take up critical perspectives at every moment as it is to imagine that they always focus on the authentic and the deep. As a mentor of mine reminded me recently, there are many things worth learning, and many ways to learn them.

Even so, it strikes me that we in the deeper learning world need to be making a much more concerted effort to engage with our criticallyoriented peers and colleagues. We could start right here, by inviting folks from the critical pedagogy world to contribute their perspectives and critiques to this publication and others like it, and then we could build outward. Because it's clear that deeper learning is not yet fully "woke." And now, more than ever, it needs to be.

(Note: This article was originally published in *Education Week*. Reprinted here with the author's permission)

Project Gallery

Teachers and Students High Tech High Schools and other Innovative Schools

n this gallery, we offer a set of *UnBoxed* "cards" that provide quick, concrete glimpses of projects we find inspiring and practices that support teaching and learning. These cards are now freely available on our *UnBoxed* website in a printer-ready format: *http://www.hightechhigh.org/unboxed/cards/*. Simply print, fold, share and discuss. As always, each card on the website refers the reader to a web address where further information is available.



"There are no secrets in the cockpit." -Jackie Schuman



Call Sign: Courage

Kelly Jacob, Chris Olivas, and Max Cady, 8th Grade High Tech Middle North County

Students collaborated with the USS Midway museum to capture the stories of Naval Aviators and celebrate the 100 year anniversary of the "Wings of Gold" insignia. In humanities, students read *Unbroken* and interviewed current and retired aviators to capture their stories involving call signs and moments of courage. In science, students learned about Newton's Laws and the forces of flight in order to build flying vehicles for the the San Diego Air and Space Museum's "Fly Your Ride" competition. Students also created a digital scratch project to showcase photos and mementos of the aviators' experiences. This project culminated in an exhibition onboard the USS Midway Museum.

Teacher Reflection

Though the project centered around aviators, the heart of the project was looking at human experiences and the importance of telling and archiving stories. The students and aviators each created lasting impressions on each other, and having an authentic audience drove students to produce high quality portraits and stories that both students and aviators were proud to stand next to. We were proud of our students' growth mindset in planning, designing, building, testing, and revising their vehicles for the competition at exhibition. This was a great project to apply NGSS 3 dimensional learning.

Student Reflections

My partner and I made our flying vehicle thinking it was going to work with no problem, but we were wrong. We used our original vehicle to look at the flaws and how to improve it. Then we made a second, third, and fourth draft, each time looking through every flaw. We eventually made a working vehicle and were proud that we kept working on it until we got it right. —Canon

I now have a different perspective on the people that serve our country. I saw war through their eyes, and it really made me appreciate everything that they do for our country. —Dani

To learn more visit: 8thgradehumanitiesjacob.weebly.com/callsign-courage.



Destruction and Restoration: A History of Sausal Creek

José Garcia and Lindsay Weller, Grade 4/5 ASCEND K-8, Oakland, CA

Fourth and Fifth grade students at ASCEND learned about the fragility of a local urban watershed and considered how human activities can be both destructive and restorative. This expedition drew content from science and history and learning was expressed mainly through art and writing. As a culminating task, student docents led families and other community members on a tour of the visible products of their learning. These included botanical drawings and research writing highlighting native plants found in the Sausal Creek watershed. Students reflected on their role as community members and have seen how real world problems are solved through collaboration, perseverance, and compassion.

Teacher Reflection

We realized that all the smaller process steps along the way to publishing the field guide were also essential products for students to use as launching points for their docent tours during our exposition of student learning. Aside from the final art and research for the field guide, students presented writing, reflections, and art from field trips and classroom activities. Additionally, we were pleased that students had the opportunity to educate the local community on the delicate nature of human impact on our natural environments. Students and the school community benefited by becoming advocates for responsible choices and stewardship of the environment. Ultimately, they learned that their voices truly matter and can make a difference.

Student Reflections

Everybody that saw my work was very surprised that someone as young as me had so much stuff to show and that made me realize that all of my hard work really paid off. —Dyana

I learned that people can make change for good. For example, Friends of Sausal Creek are trying to grow native plants and plant them back in Sausal Creek. —Jaime

To learn more visit http://efcps.org/our-schools/ascend/



Give Me Shelter

Sacha Casciato, Math/Science; David Visser, Humanities Charley Jacob, Makerspace High Tech Middle North County

In this project we discussed the issue of homelessness and poverty to encourage students to develop empathy and to see the world from different perspectives. Students took a closer look at the underlying issues of homelessness. We examined the issues of resource availability, equity, and access. We grappled with questions about over represented populations. Students took a hard look at their own biases and misconceptions and developed a better understanding through community service. Students created change with public service announcements, demonstrations holding cardboard signs with facts and statistics, and the creation and implementation of community food pantries.

Teacher Reflection

We saw a tremendous shift in our students' thinking and perceptions about what it means to be homeless. Throughout the process it was evident that students were growing as empathetic individuals who wanted to create change in their local community. Each student worked to help the homeless population in our community gain access to much needed resources.

Student Reflections

This project was based on empathy and helped us see how the other half of the world lives, and that we can do so much to change the world if only we try. —Emersyn

The campout made me realize that the homeless live in harsh conditions, like cold, rain, and hard places to sleep. Having to build our own shelters helped me understand because ours fell down in the middle of the night. —Ashby

I had seen some homeless people in the park in Escondido but it was drastically different to see the camps downtown. —Bree

To learn more visit: Mrvisser.weebly.com, Mrscasciato.weebly. com, or Charleyjacob.weebly.com



Here Now, Gone Tomorrow

A Children's Book on Climate Change and Its Impact on Endangered Species

> Created by High Tech Middle North County & High Tech Middle Chula Vista



Here Now, Gone Tomorrow

Curtis Taylor and Ivan Recendez, 6th Grade Math/Science High Tech Middle North County and High Tech Middle Chula Vista

As a collaborative project between the Chula Vista and North County campuses, students created and published a children's book detailing their chosen endangered species challenged with the impacts of climate change. Students created a watercolor illustration of their endangered species which was included in the children's book. Our created children's book is now being used to help educate other students and the public, on how human impact has become problematic for our wildlife. This project was aligned with the Next Generation Science Standards.

Teacher Reflection

This was such an impactful project dealing with a very important issue, not only in our country, but worldwide. Students were able to be scientists, researchers, artists all in one through this project. To have the students create their own learning around this issue by exploring this phenomena really allowed for them to want to become activists. Also, the cross-school collaboration allowed for our schools to come together. We feel literacy is very important and we wanted to find a fun way to incorporate it in a math and science classroom. We saw students step out of their comfort zone, and we teachers did too. We had no experience using watercolors, and it was great learning experience, which we shared with our students.

Student Reflections

I feel good about helping the earth, because now I know ways to save the environment in the future. —Rishi

I didn't know I could paint. My animal looks really cool! —Leo

The best part was seeing my book on a website. People can buy it and my name is there. —Illeana

To see or purchase the book, visit http://www.blurb. com/b/7640975-here-now-gone-tomorrow



Living North County

Carol Cabrera, Kurt Schwartz, and Julio Zuniga, 9th Grade High Tech High North County

Students explored six different North County communities through the lenses of their different classes: Humanities, Spanish, Physics, & Math. We visited Carlsbad, Encinitas, Escondido, Oceanside, Vista, and San Marcos. Students not only visited the cities, but scheduled and conducted interviews, filmed activities that high school students engage with in these areas, created short films, designed info-graphics, and studied the culture of these various communities in depth. Ultimately, in groups of nine, students designed an eighteen box spinner that was displayed at our exhibition.

Teacher Reflection

Taking a close look at what exists in our communities, in our own backyards was definitely the highlight of this project for us. So often, we think of history as what exists in books, but the truth is that we are constantly making history, and that history is living in our communities right here and now. One of the highlights of the field trips for us was watching our students hike through Annie's Canyon in Encinitas. What was interesting for the students to realize was that the subjects that they are studying in school can apply to their everyday lives in the communities in which they live. We also really enjoyed having a challenging product for the students to collaboratively build with their hands.

Student Reflections

I liked getting to talk in Spanish during the exhibition. It was really fun. I didn't know that San Marcos was known as a chicken park. —Mariana

The Surf Museum in Oceanside was really interesting, and it was cool to see Bethany Hamilton's surfboard. The building of the box was pretty fun too. There were times that it was stressful when things couldn't fit and you had to request for more, but at the end, seeing the finished project was pretty cool. I mean, we made that.

—Jake

To learn more visit http://misscarolcabrera.weebly.com/livingnorth-county.html



Matter That Matters

Nicole Lively, Humanities and Sophia Oller, Chemistry High Tech High Media Arts

In this collaborative Humanities and Chemistry project, students worked in partnerships to comprehensively research a "problematic" element, compound, or material and its effect on society, both historically and currently. For example, one pair investigated chocolate and its connections to child labor; another explored carbon and conflict diamonds. In Chemistry class, students created an image that represented the conflict and used electrochemistry to etch it into a copper plate. Photographs of the copper plates and the research paper from each group were compiled into a book, which was displayed at Exhibition and is available on Amazon. Our goal was for students to understand how resources in our natural world acquire value and the positive and negative effects of the pursuit of ownership of those resources.

Teacher Reflection

What we really enjoyed about this project was that the interdisciplinary collaboration felt really natural and authentic; students were able to synthesize their knowledge from both classes at a higher level, and it was rewarding to see. There was also lots of room for student choice and we ended up with with a beautiful and rigorous final product. Seeing students at Exhibition fluently switch between talking about the electrochemistry of copper etching and historical conflicts over resources was inspiring.

Student Reflections

The importance of a material is influenced by its chemistry a lot, because its chemistry gives it the properties that make it important. —Roan

I learned that you always should look into a conflict. Always see the full story and never just blindly accept the media's version of it. —Eden

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One Drop at a Time

Christine Sullivan, 3rd/4th Grade Social Studies and Language Arts Austin Discovery School

There were three major components to this project: A class novel study of the novel A Long Walk to Water by Linda Sue Park, students researching and writing a persuasive speech, and the building of soapboxes. The novel served as a case study of how millions of people in Africa lack to access clean drinking water. After reading the novel together as a class, students were asked, "What are the top environmental crises faced by the world today?" Students took several weeks to research topics such as: deforestation, reviving the world's oceans, air pollution, agriculture and transportation systems. The final product of their work was to write a 1-3 minute persuasive speech. For our exhibition of student learning, the 3rd and 4th graders were asked to read their speeches aloud at our school-wide celebration of Earth Day on April 22, 2016. During the weeks leading up to Earth Day, our class took a field trip the Austin Tinkering School. Then using woodshop tools, students worked in teams of four to construct soapboxes so that during exhibition they would both literally and figuratively, "Get on their soapbox" and speak about an environmental cause.

Teacher Reflection

Students are living in an era where climate change is their inheritance. It was inspiring to see them be both passionate and well informed as they delivered their speeches. Having an audience of students ages K-8th grade and their parents, helped the students believe that their words mattered.

Student Reflections

All Americans have a voice! So let's use it! —Alyssa

Always remember, 'Don't make greenhouse gas, so that we can all last!' —Jaxon

So here goes my pep talk, you might be small compared to this world, but you can help! —Liberty

To learn more visit http://www.austindiscoveryschool.org/



Wise Kids Traditions

Daniel Wheat, 4th Grade High Tech Elementary

We students thought it pretty important to think about one of the most critical things facing our generation – our health, our energy, and our youthfulness. We often hear mixed messages about what to do and what not to do. But, you rarely hear or read about the practices of indigenous people. Sometimes we forget to check out history when we try to solve problems. What can we learn from people who were connected to their food, their land, and to each other? What were/are they doing differently? How were they able to avoid some of the common diseases we see in our communities today? There were a lot of questions that we wanted to answer!

Teacher Reflection

I wanted a project that gave students the opportunity to challenge and investigate. But I was amazed at how much students learned during this project. They could identify fat and water-soluble vitamins and share the role that certain vitamins play in the body. This was completely foreign information to them. I really wasn't sure how they would respond to trying new things like organ meats, kombucha, bone broth, sour dough bread, raw cheese, kefir, sauerkraut, and homemade butter. By the end of the project, students genuinely appreciated these foods (notice I didn't say they enjoyed eating each of them... yet) and understood why they were valuable to so many indigenous peoples. A year later, I still have students that talk about the project. They share about their learning, and show they continue to investigate matters that are critical to our health.

Student Reflections

Ancient people knew how to prepare foods, and found the best ways to get nutrients from food. —Owen

You should try to stay healthy with the right foods, instead of spending money on medicine with side effects. —Aaron

To learn more visithttp://www.hightechhigh.org/hte/





Plant and Insect Life Cycles

Julie McMillan and Kate Snyder, Second Grade Science ASCEND K-8, Oakland, CA

Throughout our twelve-week expedition, Second Graders became botanists and entomologists as they cared for and cultivated plant and insect life. We integrated arts and science curriculum to study painted lady butterflies, silkworms, fava beans and marigolds. Both in class and at home, students watched the life cycles unfold in real time and compared each species' stages of growth. This science expedition interwove the ASCEND values, ELD, writing, the arts, community service, and technology. At our school-wide EXPO day, students sold hand-crafted informational coloring books on the life cycles of fava bean plants and painted lady butterflies. Second grade scientists shared their informational reports and led members of the community through a tour of our 3D plant and insect sculptures. Our expedition culminated in class performances of seedling and butterfly poems.

Teacher Reflection

It was amazing to watch our students transform into scientists. When insects came to our classroom in their larval and egg stages, these budding entomologists demonstrated compassion as they cared for and observed the insects in their stages of growth. In science-integrated ELD students practiced and internalized new scientific vocabulary that they later used in their investigations. We kept a bilingual blog and a 24-7 insect webcam so that students could observe the life cycles of our insects from home. In art, students connected their studies to create 3D models that were larger than life, which proved to be very fun and messy!

Student Reflections

What was fun about EXPO was that we got to give away our seeds after we gave tours to the people who came to visit. —Erick

The coolest thing at EXPO is that I performed a poem in front of probably sixty people! We played instruments and did a poem on stage to represent seedlings. We did the poem in English and Spanish, to show how a seedling becomes a bigger flower. —Jayla

To learn more visit https://ascend2science.blogspot.com/



Design Challenge: Beekeeping in Doha, Qatar

Lisa Bastedo, Maria Manacheril, and Rachel Rust, 10th Grade Biology American School of Doha

After doing an in depth study about the decline of honeybee populations in the United States, our students were presented with a challenge to design beehives that would be able to withstand the harsh conditions here in the desert of Qatar. Students read about local beekeepers and the problems they faced and then designed hives to solve problems such as extreme temperatures and dust storms. Students tested their prototypes and followed that with a redesign. Despite having limited resources for this sort of project, they were able to produce impressive hives that were indeed effective in solving their problem. The student designs ranged from internal cooling systems to insulated outer layers to the hive.

Teacher Reflection

This was our students' first introduction to the design thinking process and engineering practices in NGSS. We were impressed with students' engagement in the project and their genuine concern for declining honeybee populations. Going forward, we would like to be sure that students are personally connected with the local beekeepers that are here in Qatar so that we can have implementation of their designs by the beekeeper.

Student Reflection

It is important to listen to other people's ideas and not just your own as we need to put as many ideas as we can on the table in order to have a good design. —Jude

I previously had no idea that there were so many types of beehive designs. —Andia

The high temperature and dust have a huge impact on the survival of bees here in Qatar, but with a well thought out design, we can solve those problems. —Eleyna

To learn more visit http://www.asd.edu.qa/



photo provided by Lisa Griffin

Building Empathy Through Action: The San Diego Sanctuary Project

Ariana Campos Gary and Jerri-Ann Jacobs High Tech High

Ariana Campos is a tenth grader at the Gary and Jerri-Ann Jacobs' High Tech High School in San Diego, California.

eenager. What does that word make you think about? Do you think of recklessness and little care for the world or do you think of empathy, excitement, and hope for a good future? There are many life experiences that make a person who they are, but some experiences help teach compassion and help teach hope. This isn't any different for teenagers; we want to experience life and make the world remember our names. We can go out and start experiencing compassion in the world around us now, so why wait for our futures to come and find us?

This semester, through our Humanities and Spanish classes, we have been working on a project called The San Diego Sanctuary Project, where we are learning about the international refugee crisis and finding ways we can help refugees in our community and beyond. We have interviewed people involved in the refugee crisis, learned about how we can help refugees, and are exploring how to build empathy and support for refugees in San Diego through art and education. One person we interviewed was Wasim Alabrash, a Syrian refugee and translator for the Syrian American Medical Society who spoke to us from Athens, Greece, where he awaited resettlement to Ireland: "I am one of thousands of Syrian refugees fleeing the war, killing, and destruction... Our hope is just to live safely away from the murder and blood every day."

Learning about the hardships that refugees face sparked our emotions and made us want to do more than just learn about the crisis; we wanted to make a difference in their lives. From the ideas and requests people shared in our interviews, we made seven action groups where we are using our interests for good. For example, one group of students, inspired by their interview subject who was a professional Syrian soccer player, connected with a local tutoring and recreation organization to invite our schoolmates to play soccer over several weeks with refugee teens at a local school. Sparked by an interview with a long-time San Diego educator and advocate for newcomer students, another group now volunteers at an elementary school with a large newcomer program, tutoring students who are learning to read and write in English. I am a part of the tutoring group, working with kindergarteners who are learning to write and spell their names. In this internationally diverse student group, I see their innocence. These kids did not choose to be uprooted from their homes but they were still uprooted, and though life may be difficult they are still being kids, learning, playing, and working towards their dreams in a safe place where education and support create possibilities. Working with small children and helping them write in a new language is extraordinary; I am connecting with kids who are achieving great things. These innocent children are getting educated and we are helping them, which is beautiful. Educating and involving ourselves in the well-being of others is helping to create empathy.

Empathy is an important thing, and sadly some people don't have it, especially toward people they perceive as "different" than them. It is a valuable life skill that can take us far in this world full of people in need. The first part of our project was the empathy stage where we learned about all that refugees go through in their journeys. When learning a person's story of struggle and survival, of persecution and danger, I couldn't help but feel this perpetual need to do something that would help them. I thought most people felt the same as I did, but as we learned about the unwillingness of some governments and individuals to help others, it has been disconcerting. I question the world around me, wondering why more isn't being done to help these innocent people in need.

Through staying informed about current world issues I was able to form my own opinions and beliefs, which is very important, for my generation will be tomorrow's leaders. With the media playing a big role in deciding how the refugee crisis is perceived, at times it can be difficult to get clear information and make our own opinions, but tracking the news in a classroom environment has been beneficial because we are in safe space where we are getting multiple perspectives on this controversial but extremely important topic. We are learning about human lives, not just numbers on a chart, we are becoming truly educated on an issue that affects many lives worldwide.

In class we are learning about things that are relevant to today and about political decisions that have the power to shape our society. We have stayed educated and informed on major decisions around refugees and the executive orders, which we called the Travel Ban and then the Travel Ban 2.0. We learned different ways of staying educated through relevant articles, news updates, websites, and documentaries. Through the refugee crisis and the travel ban by President Trump, now more than ever refugees are known and seen by the public. It seems as if public opinion is split, humanizing these people or turning their backs on them, which gives the impression that our society is shifting into an isolationist and xenophobic community. With a topic so politically controversial it is compelling to want to learn as much as we can. In our education of the refugee crisis and all that they go through, we have become more and more interested in doing something to benefit the refugee community. I've realized that empathy has no age limits; it has no borders, and it has no limitations to what it can achieve with the help of a little education and determination.

As we learned about the new president's executive order banning and restricting refugee resettlement and more, we also saw compassion from individuals, communities, and organizations trying to help refugees in any way they could. We wanted to get involved with these people and make change happen. Our team of high school students is actively working to support and welcome San Diego's refugee communities with small acts of kindness and service in partnership with local and national organizations, as well as to speak up in support of the humanization of refugees. We want the future to be better than it is now—not just for any single one of us, but for all.

We were all able to find paths of community service that fit our interests and passions, therefore making our work with the community more meaningful and having a long lasting impact. In my group, fifteen students would drive to Ibarra elementary twice a week, our means of transportation often varied and sometimes in limbo. When we were volunteering at Ibarra, the rest of our class was back at school working on their "action" or volunteer plans. Everyone had jobs to ensure that work was completed efficiently and correctly. Volunteer drivers and parents helped us get to Ibarra many times; without them we wouldn't have been able to go. In order to go on field trips and take students where we needed to go for our action plans it was vital to stay in contact with students' parents and see if they could not only help transport us places but connect us to people that helped us enhance our educational experience.

Communication is key for a successful project that has many components and skills. Students have drafted and sent out numerous professional emails explaining the San Diego Sanctuary Project and what we would need from the person we were emailing. For example, one action group has been collecting household supplies for refugee families in our community. They are collecting items for two refugee organizations: Survivors of Torture and the Syrian Community Network. Once they collect all the household supplies, they are going to deliver all the donated items themselves to the Syrian families directly. Through email they have been in contact with the organizations and they have also had a phone call with the head of the Syrian Network Community to discuss the items needed for donation. This action group believes that no matter what the circumstances are and where a person is from, everyone should be accepting to refugees. A member of this action group feels that when teenagers organize fundraisers or things in service to others, some people don't believe that teenagers can accomplish things professionally, but this project is proving them wrong.

With this learning experience, I have been able to better understand and take part in conversations about the refugee crisis. Learning about the refugee crisis hasn't just taught me about refugees, it has also taught me about America's society and the different political views that people are acting on. I have had discussions with family members about President Trump and the actions he's taking on the refugee crisis where we both give our views and opinions. I have always shared my opinions on current world events but now I am more educated about it. When discussing a topic that is known to many and at times controversial, it is important to have facts and resources to back up your claims. For example when I first started this project I would say that I didin't agree with the travel ban on refugees but I didn't give any explanations as to why. But now if I were to have a conversation with someone I would be able to express my views on the Travel Ban, justifying my position using information and personal experience from this project.

This is the most meaningful project I have worked on and it has given me a new outlook on the world around me. I think of this project as more than just a letter in a grade book; this project is valuable because it has been creating empathy and showing us how to act on empathy in ways that will benefit ourselves and others. Now I view the world with different lenses, not just my one point of view. It is also valuable to learn and teach about current topics for both the student and teacher. We as a society are in a time of response through action; what better way is there to show empathy than to educate ourselves and our society about the worth of the world around us and the people who live on it?

Deconstructing Myths and Clarifying Truths: Teaching Islam in an Age of Misinformation

Rachel Otty Cambridge Rindge and Latin School

There are times when I recognize the importance of my job as a history teacher more than others. Now is one of those times. I am a teacher at a large, comprehensive public high school in Cambridge, Massachusetts, where I teach a semester-long course about global history with a focus on the modern Middle East. With a significant emphasis on recent conflict in the Middle East, I aim to push students to grapple with the intent and impact of U.S. foreign policy decisions in the region. During the last decade, I have worked to push my students to explore the historical roots of modern conflicts so they can better understand what's happening today in the proper context. I also aspire to turn them into critical consumers of news media, where, if I have done my job right, they will question what they read, cross check the information, and not take anything at face value. When the course is over, students walk with away with a more complete framework for understanding the Israeli-Palestinian conflict, the recent wars in Afghanistan and Iraq, the U.S.'s historic relationship with Iran, and the causes and effects of the current war in Syria.

The number one thing students tell me after taking the course is that they feel more confident having conversations with adults about the news. I feel gratified when I hear this and heartened that maybe I've played a part in helping my students be more globally informed citizens. But what's been nagging at me over the last couple of years is what I have neglected to do for my students in my pursuit to build their understanding of history in the Middle East. In light of what now seems like almost constant misinformation about Muslims in our contemporary media and political environment, I know I haven't done enough work to build my students' understanding of the diverse conceptions of Islam.

This year, I shook things up. I decided to lay some cultural and religious groundwork before I started teaching my students about Middle East history and foreign policy. What I failed to fully recognize until this point was that despite my own knowledge about religious literacyinformed by Harvard Divinity School Professor Diane Moore's religious literacy framework—I hadn't communicated this at all to my students. Her framework emphasizes three major tenets of religious literacy-religions are internally diverse; religions evolve and change over time as opposed to being ahistorical and static; and religious influences are embedded in all dimensions of culture. I assumed my students had a similar set of guiding principles concerning the study of religion and that as a result of growing up in an ethnically, racially, and religiously diverse city they would, by default, know this stuff. While I'm sure many of my students did understand these tenets on some level prior to my course, were these messages ever explicitly communicated to them? I no longer wanted to assume they were. So, instead of jumping right into the lessons of border drawing and nation building in the Middle East, we started our unit with lessons on religious literacy, with a particular focus on deconstructing myths and clarifying truths about Islam.

My students spent several days becoming acquainted with the religious literacy framework. They read, we discussed, we struggled with theoretical language, and we watched videos to help us make sense of what we read. We grappled with what it means to be religiously literate and looked at case studies where students had to put some of their own beliefs aside in order to develop a fuller understanding of who is included in a religious tradition. For example, can a group who espouses what many might regard as intolerant and hateful rhetoric in the name of God still be considered part of a religious faith even if it doesn't square with one's own understandings of what it means to practice that faith tradition? Using the methodological framework around religious literacy, we applied our understandings to this question and others.

Then we took these lessons and focused them specifically to our study of Islam. Most of those who live in the region we refer to as the Middle East today are adherents of Islam. Many of the countries we study are majority Muslim nations. And yet, much of what students have heard about Islam and the Middle East more generally over the course of their lifetimes has largely been through the lenses of terrorism, war, and fear. Exploring Islam within its historic, cultural, and social context before diving into our study of contemporary conflict in this region becomes even more critical in this sociopolitical environment. In an effort to deconstruct myths and clarify truths about tenets of Islam, students worked in focus groups to become more knowledgeable about different sects of Islam, veiling traditions within the faith as understood scripturally and historically, Islamic law, and Islam in different socio-political contexts. After our week of exploring religious literacy and its applications to Islam, I felt students had learned something. Many things, even. I asked them to share their takeaways with me. What I received from my students confirmed for me the importance of beginning our unit in this way. A few comments from the students:

"I used to think that violence and war in the Middle East were caused by Muslims and what is written in the Quran. Now I think that's not true; I believe Islam promotes peace but individuals interpret the word of God in different ways."

"I used to think religious literacy was the ability to read your holy book but nothing else. Now I know that it's being able to look at a variety of religions through different historical and cultural lenses."

"I used to think religion played a more concrete role in informing people's ideologies; now I think about perspectives from a more socio-political-religious standpoint: you cannot see religion out of its political/cultural context."

After nine weeks of studying the Middle East, I feel more certain that my students have walked away with an understanding that this region and those who live there should not be understood only through the scope of war and terrorism. I think they understand that groups who carry out acts of violence in the name of religion do not represent the beliefs of everyone who identifies with that faith. In our current political climate, where our leaders rely on easy and facile explanations for complex issues around faith and politics, the importance of our roles as history teachers comes into even starker relief. We are called upon to step up and resist fearmongering and to continue the work that has always been critical to historians: to put what has happened in the past and what is happening now in the proper and complicated historical context that is necessary if we are to be truly informed and engaged citizens. My hope is that my students are now better equipped to right incomplete narratives about those deemed "other," question and challenge information they receive from media and elsewhere, and step off the sidelines to serve as advocates for themselves and allies for others in the face of policies and rhetoric that threaten the democratic ideals we all hold dear.


photo provided Kat Deaner

Educational Video Games and Transdisciplinary Problem-based Learning

Heather McCreery-Kellert and Sheli O. Smith The PAST Foundation

sixth grade student sits staring intensely in front of his laptop, fervently clicking his mouse to place sandstone blocks in the popular video game Minecraft. As the teacher moves behind him to view his screen, he tells her that after scaling his pyramid to half size, the structure was still way too big, but scaling to quarter size was too small and wouldn't "look cool." Should he scale the model to one-third size? He would have to round to a nearest whole number, but that was okay, right? The teacher asks him to explain how he would divide and round the various dimensions of the pyramid, and the student responds by quickly typing on his calculator and scribbling a few numbers on a sheet of paper, before reporting his idea.

The above scene occurred in a recent session of the Minecraft Mathematics Middle School program at The PAST Foundation, but the scene is a common one in the program, both in regards to the structure of the student-centered dialogue with the teacher as well as to the seamless application of mathematics and other subjects within the game. At The PAST Foundation, we are seeking out ways to use educational video games like Minecraft as a tool and application for learning. Specifically, we are exploring how Minecraft might be used with Transdisciplinary Problem-Based Learning (TPBL) to enhance student engagement and critical thinking through differentiation and collaboration.

The aim of this article is to depict (1) why video games can be an effective tool in education, (2) how we are using video games as an effective tool, and (3) how teachers might use Minecraft or a similar educational video game to enact student-centered learning.

Defining TPBL, Minecraft, and Video Games as Effective Educational Tools

Some argue, "but why video games? Aren't they just games?" Video games naturally teach us to play the game itself better, and affect how we process information—so what if we could take what students are already learning through a game and integrate the game's objectives with core content concepts? For example, rather than pausing an engaging scene with a pirate ship to ask the player to solve for x in the equation, the game might involve a fictional sea battle, and challenge the player to calculate the necessary elevation of the cannon needed to decimate a rival ship, given certain facts on hand. The same mathematics content is addressed, but the content is relevant to the student because it connects to a context within the game's objectives, a more tangible application.

Engagement in Relevant Content

Much of the current existing research on educational video games lacks empirical evidence (Connolly, et al., 2012; Mayer, 2015). This is an aspect of serious gaming that the PAST Foundation is addressing in our research using Minecraft with a TPBL approach. While we have yet to battle the Barbarossa Brothers off the coast of North Africa near the beginning of the sixteenth century, we use Minecraft to simultaneously address content in mathematics, science, language arts and social studies while solving a relevant problem. TPBL is just that—a method of planning and implementing such that content across multiple disciplines is intertwined during the problem solving process (Smith & Corbin, 2010-2014). For example, in the article's opening, the problem was for students to replicate a monument within the Minecraft world as accurately as possible, with plenty of opportunities for creativity, of course. The problem was relevant to students, because a natural reward of the game is the satisfaction achieved from examining and exploring one's build. Students were eager to create something stupendous to show off to their classmates and teacher, and were provided with structured objectives to do so. These objectives included articulation of mathematical thinking and scientific processes, as well as storytelling incorporating social studies and language arts standards.

Mathematical problem-solving elements and critical thinking surface naturally in Minecraft when students address constraints while replicating or designing their own structures. During the Build Your Dream House project, middle school students incorporate multiple diagonals into their group's build—a challenge with cubic blocks in the game, but quite aesthetically rewarding in the end, with opportunities for creativity and differentiated learning in the scope of strategies for diagonal design. Students must work together to plan the location of their diagonals in their dream house, and then figure out how they will make their diagonal as "smooth" as possible using mathematics.

While solving this smoothness problem, two students recently demonstrated critical thinking as they discussed how they might divide the length and height of a diagonal by the same number to "chunk" it before further "smoothing" it block-by-block. The ease of placing and destroying blocks in the game helped them further evaluate and modify their design while sharpening their collaboration and communication skills as by-products. Students seemed to recognize that the more effectively they worked together, the more fantastic, both in size and detail, their builds could be. For example, in their final presentation, one of the two students above mentioned how working with the other student on particular diagonals helped him focus and create a more impressive build, both mathematically and aesthetically.

Engagement in the Project Design and Process

Minecraft partners well with the design process, because of its openworld setting for building almost anything else one can imagine. In the game's Creative Mode, students choose between different colored and textured blocks as well as decorative materials that might involve electrical or light-projecting functions. Minecraft boasts a large subculture evident on websites such as Minecraft Building Inc, Minecraft Forum, and on various YouTube Channels where individuals exult and teach their skills in the game. As part of the problem-solving process, students are allowed and encouraged to research online Minecraft resources to brainstorm designs and solutions for problems' constraints. We have noticed that students engaged in a relevant problem-solving process spend the majority of their time on task. Thus Minecraft as an engagement tool eliminates many behavioral issues discussed by today's teachers.

In their *American Journal of Play* article, Eichenbaun and colleagues note that time on task is directly proportional to learning outcomes, and that the inclusion of rewards and their timing can have a major impact on motivational factors (Eichenbaum, Bavelier, & Green, 2014). Minecraft Mathematics began five years ago at the PAST Innovation Lab; the project designs have evolved over the years from directly infusing content into the game, to adapting the content to better fit the intrinsic rewards already present in the game. As these adaptions occur, and our data collection continues to grow, we have noticed higher levels of student engagement, and greater academic vocabulary articulated in peer-to-peer conversations, as well as during final presentations of learning on the last day of class.

Recent computer science research shows that "learning is most effective when it is active, experiential, situated, problem-based, and provides immediate feedback" (Connolly, E. Boyle, MacArthur, Hainey & Boyle, 2012, p. 661). Through the context of Minecraft, abstract concepts are translated into applicable tasks, so that students see the concepts in action, and how they apply to tangible problems. Immediate feedback is provided to students as the teacher circles the room, applying a variety of formative assessment techniques and probing questions to evoke student thinking and articulation. To address differentiation, the teacher also challenges certain students to go deeper with content ("describe how you might build a diagonal with the opposite reciprocal slope") while supporting those who are struggling ("let's revisit rounding...how might you round here?"). Additionally, students present their progress to the class at the end of each day to show off their builds, but also to receive timely feedback and support related to the problem.

Lessons Learned from a Minecraft TPBL Example

While the Minecraft Mathematics program includes only one discipline in its title, projects presented in class incorporate all disciplines from engineering to art. One of the more developed projects at the middle school level is the aforementioned Build a Monument challenge from the article's opening:

Build a monument in Minecraft as accurately as possible. While you must use the real-life dimensions of your monument, you may be as creative as you would like!

Students are free to design the majority of the monument as they wish, but must use information researched online and present evidence for how they incorporated the information in their build. Transdisciplinary content includes mathematics around dimensions (i.e., conversions, slope, and number sense), social studies (i.e., geographical and historical contexts), and language arts (i.e., presentation and communication skills).

In addition to the main problem, a TPBL unit includes a variety of subproblems and scaffolded steps that students traverse. For example, one of the first sub-problems in Build a Monument occurs when students determine the scale of their replication. If one block in Minecraft is equivalent to one cubic meter, how many blocks will make up the various dimensions of the monument, and will there be enough time in class or space in the game to replicate the structure on a one-to-one scale? A group of students who recently built the Eiffel Tower halved the monument's size in their build, but were still unable to complete more than the legs and first level due to the time constraint of the class. The process of designing, building and evaluating against defined criteria and constraints leads to deeper learning and lively discussions. The student in the opening scene scaling the Great Pyramid of Giza researched and converted a height of 455 feet to meters. He thought aloud about halving and quartering the size before finally deciding on dividing all dimensions by three in order to arrive at a design that he felt was possible given the time constraints, and a level of detail he wished to achieve. His thinking aloud helped him and his classmates as they all tackled problems of conversion and scale. This could have never occurred if the concepts of conversion and scale had been delivered by lecture in the abstract.

A second sub-problem of the project surfaced when the students building the Eiffel Tower were unable to make the legs of the tower consistent. Their first attempt looked more like "spider legs" than an architectural masterpiece. This provided a teachable moment: we reviewed the concept of slope, and I asked how it might relate to their builds in Minecraft. Some students were able to articulate the connection between a pixelated diagonal line, and changes in horizontal and vertical lengths (x and y coordinates, graphically). As the students continued their work, I asked them to come up with a plan for calculating the slopes of the Eiffel Tower's legs, as well as delegating sections of the build. During his group's final presentation, a student noted his appreciation for using strategies to build more efficiently.

While Build a Monument is primarily aligned to mathematics concepts, social studies and language arts applications are also incorporated as students research online, collecting information about materials used, dimensions, and historical facts. Furthermore, students are required in their final presentation, to tell the story of the monument and its significance. One student modeling part of Machu Picchu, not only shared information about the location itself, but also delved into the history of the Inca Empire, and replicated artwork he researched online within his build. While this level of historical exploration was not required, the opportunity for students to explore their interests helps emphasize the TPBL elements of the project.

Implications for the Use of Minecraft in Classrooms

Teachers interested in using Minecraft as a tool to inspire learning, especially through a TPBL framework do not need to be experts in the game itself. Although we built a few things in the game prior to designing the first course, we found that many students regularly teach each other (and the teachers!) about the game. Even today, we continue to adapt our lessons as we observe and learn from students. Minecraft projects are easily modified for younger and older grade levels through expectations for depth of research and concept articulation. Problems and building ideas might remain the same with levels of complexity changing to fit specific age groups. For example, while third and fourth graders may not know about slope in algebraic contexts, the concept can still be used for building a certain number of blocks "up" versus "over" and then connecting those directions to the x and y axes, which are viewable in the game.

Teacher organization and facilitation are vital to all problem-based learning approaches. Simply handing a project sheet to students with boxed objectives is not enough. Students are more engaged with the academic concept when facilitation and communication are regular and ongoing, as well as targeted on their builds. This type of interaction allows for improved differentiated teaching with regard to content. It provides more opportunities to ask probing questions and extract student thought processes. In this type of instructional strategy, formative assessment is constant and constructive. Students quickly gain the confidence to continuously think aloud about their designs and communicate with one another about their plans.

Therefore, implications for teaching with Minecraft encompass a student-centered approach in which the game technology is gracefully balanced with facilitation of group-worthy projects that incorporate rich content. Rather than act as the Minecraft and content expert, the teacher probes students to explain and show their thinking, building their problem-solving, critical thinking, and communication skills. Students often fail to recognize they are developing these skills due to their engagement in a hands-on experience relevant to them, which is why it is helpful to ask students about their interests. TPBL excels when the problem or issue is relevant to the student. Some students may not care about the Eiffel Tower, but without doubt there is a building or monument that does intrigue them. It may be the local airport or Machu Pichu. The importance of the exact object or place being scaled or smoothed diminishes for the purposes of the content, but increases for the importance of resonance with the students and their willingness to delve deeper in researching collateral information.

Engagement is the vehicle of learning. All concepts for all content areas can be crafted around the problem if students are engaged. Employing a tool like Minecraft that teaches multiple skills and provides a platform for hosting multiple concepts simultaneously empowers teachers and guides students in learning, teaching them important communication, problem-solving, and critical thinking skills to be used in other areas of life.

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