STEAM into World language Education

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The new trend toward STEAM education has rapidly become prevalent in today's schools. STEM has been a popular acronym for at least a decade now, with increased focus on science (S), technology (T), engineering (E), and math (M), often to the detriment of the Humanities, especially the arts and world language. World language educators may be excited to learn that STEAM is a big move in the right direction for our profession and for our students. By including that long-neglected "A" for the Arts, STEM becomes STEAM, which is truly much more multifaceted and inclusive of world language education. In fact, world language teachers and their students have a lot to be excited about if their school or district is moving towards STEAM education.

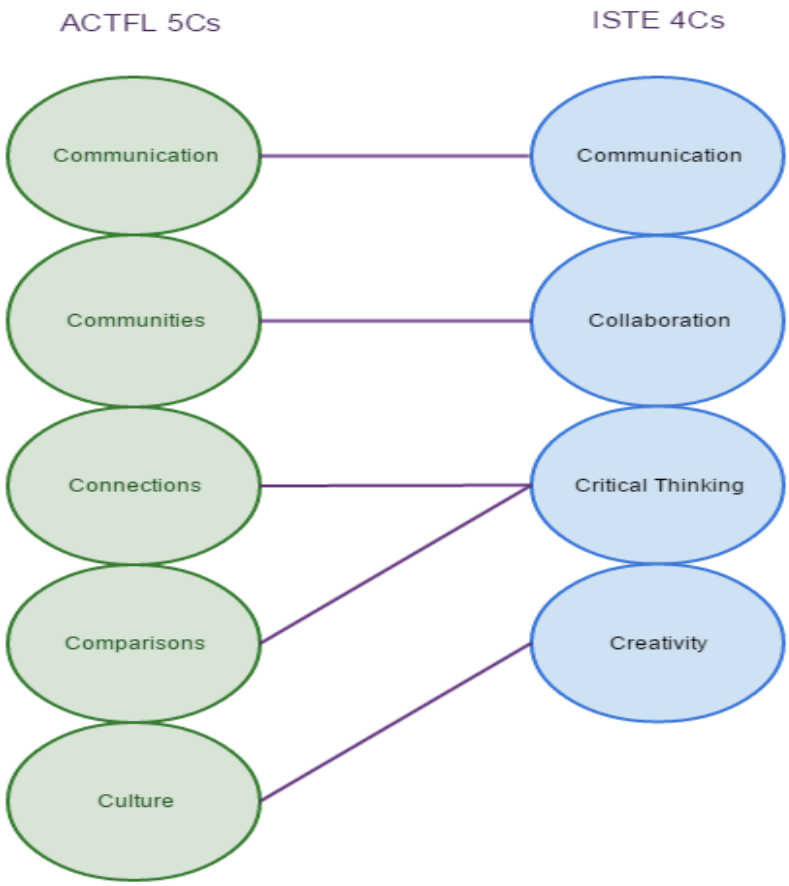
According to EducationCloset, "STEAM is an educational approach to learning that uses Science, Technology, Engineering, the Arts, and Mathematics as access points for guiding student inquiry, dialogue, and critical thinking" (What is STEAM, 2014, para. 3). In this statement, the elements of STEAM are only the means to achieving the more important goals, which are related to language. "Student inquiry, dialogue, and critical thinking" are all core goals of the world language classroom and things that we do every day as we use language with our students and teach them to use language in functional and creative ways. Language is the glue that holds STEM together, especially in our ever-changing and global 21st century world. How do engineers build and design buildings, if not with language? How do creative innovators solve problems using new technologies? With language again, of course! When these innovators are working in a fast-paced, technologically advanced, and global world, being able to use more than one language facilitates this type of 21st century collaboration and innovation.

The STEAM classroom is naturally student-centered because of its strong focus on project-based and hands-on learning. Students are actively involved at all stages of the learning process. Effective and communicative world language classrooms typically already utilize many collaborative types of projects (such as puzzle-solving tasks, group discussions, and cooperative learning activities) and realia from the target culture or simply to serve as visuals to enhance communication and understanding. Problem-solving is a large component of the STEAM approach and also goes along beautifully with the goals of world language instruction. For example, students might use the target language to creatively solve open-ended problems or to create a product such as a report, a poster, or a video. The end-goals of STEAM education lead to natural connections with our world language teaching goals, such as higher-level thinking, oral communication, and managerial or leadership skills. Risk taking is also a key element of STEAM approaches, and fits well with the end goal of using language extemporaneously in the target culture. Picture yourself as a new speaker of a language suddenly being immersed in the target culture. You will need to take some risks (with language and otherwise) in order to meet your needs for food, shelter, clothing, companionship, and so forth. STEAM education promotes risk-taking as opposed to there being a perfect solution and one answer to every problem. In the world language classroom, there are many solutions to problems, just like there are in real life when we use language to meet our needs.

If you've already heard of STEAM Education, you have likely seen the focus on the Makers' Movement. The Makers' Movement encourages learners to create in open-ended ways

using hands-on materials in both physical and virtual worlds. Examples could include robotics, building with Legos and similar materials, crafting (especially with recycled/found objects), creating how-to videos, and building and/or designing virtual worlds, such as in the game of Minecraft[1]. All of these creative endeavors can be accomplished either individually or collaboratively. Most importantly, all of these activities are dependent on language. It is not uncommon for a 10-year-old child today to log into Minecraft and collaborate via text and Skype with other users from all over the world. Collaboration can happen in English or any other language, depending on the people involved. There can be a great opportunity for cultural exchange and language learning/usage.

Language teachers are usually quite familiar with 5Cs of the American Council on the Teaching of Foreign Languages (ACTFL)[2]. The new focus on STEAM education also aligns nicely with the 5Cs by bringing in the 4Cs of the International Society for Technology in Education (ISTE). The strong focus on digital literacy and digital citizenship is completely dependent on communication. In today's global world, that communication may very well be in more than one language.



The lines drawn above are a starting point in considering how the 5Cs and 4Cs align. For example, on online collaboration from the ISTE 4Cs between classrooms in two countries could bring in communication, culture, and communities from the ACTFL 5Cs. Creativity could

[1] See http://education.minecraft.net/ to learn about Minecraft for Educators.
[2] View ACTFL's World Readiness Standards for more details. http://www.actfl.org/sites/default/files/pdfs/World-ReadinessStandardsforLearningLanguages.pdf

involve creating with language. ACTFL's new focus on the World Readiness Standards illustrates how the 5Cs and 4Cs can work together in the 21st century language classroom.

Digital literacy for the 21st century and our long-standing ACTFL 5Cs can come together to increase motivation in project-based learning in the world language classroom. Research and common sense both show that hands-on projects that involve creativity and personal touches by students increase motivation and engagement. I still remember a hands-on project from my high school chemistry class. I have noticed the motivation, engagement, and lasting learning effects on my own children, as well, when they've been involved in project-based learning at their schools, such as when my teenager happily spent many hours after school on a multifaceted group engineering competition. With STEAM students are solving open-ended problems; they are self-directed and highly-motivated through activities of their own design. In this way STEAM helps to motivate students with project-based learning.

STEAM without the "A" for the arts just isn't the same. Many teachers have felt that while STEM is vitally important in our 21st century world, it has been overdone to the detriment of the arts and the humanities, especially languages. By bringing in that letter A, we also bring in the creativity that goes along with creating with language. All sorts of things can be created with language, from poems to advertisements, and from music videos to extemporaneous speech when we find ourselves in the target culture. That little letter "A" also has a huge effect on student engagement and motivation. Art truly makes the brain tick, and brain research is beginning to show the areas of the brain that light up when people engage artistically and creatively. Brain research also shows connections between the art/music and language centers of the brain (Trollinger, 2010). The letter "A" in STEAM also brings the classroom environment to life by allowing for more student direction, interest, and creativity, while lowering the affective filter. When there is less focus on the "right answer" and more focus on many possible solutions, student stress automatically reduces, resulting in more and better language output. Students have a purpose for learning and for using the target language. Creative tasks may even bring more "flow" (Csikszentmihalyi, 1990) to the classroom, when students get so caught up in engagement with a project that they lose track of time. Language is vitally important to these types of collaborative, project-based learning experiences.

Here are some ideas for instruction for world language teachers who would like to bring more project-based and STEAM-oriented activities to their classrooms:

- Students can create with language by writing advertisements, skits, and "how-to" tutorials which they can present in audio or video format using technology.
- Students can use the target language to solve open-ended problems, such as how to build a structure or create a piece of art.
- Students can work in pairs or groups to give and take directions for a task using hands-on materials (Legos, erector sets, robotics kits, or Minecraft). For example, one student might have the completed product in front of her and must give directions/descriptions in order for the other student to successfully build a replica of the product. The students then compare the results with the prototype. When working in a virtual building world (such as Minecraft) students can speak in the target language over Skype or text-based chatting programs.
- Students design open-ended products using hands-on materials (perhaps using recycled objects) and then describe what they are building/making using audio, video, presentation apps (such as PowerPoint or Prezi) or paper posters.

- Students use screen-capture apps (such as Jing) to record audio and video of themselves performing a task on the computer. For example, a student might create a tutorial on how to use Microsoft Word in the target language.
- Students can create music videos in the target language, which brings the potential for integrating both technology and the arts (music, visual art, and dance).

In addition to these project-based ideas, the gamification aspects of STEAM can be utilized both in and out of the world language classroom for practice of the target language. Gamification has become increasingly popular as a tool for motivation and engagement in all types of learning, and can be used by individuals or groups. Some teachers have noted that an additional "C" for "competition" can be especially motivating for students when used mindfully in the classroom. When individuals gamify their language learning, they have more control over the speed and amount of time practicing language. This is helpful for students who need additional time on task and for students who may want to move faster and learn more.

- Students can create games or use existing games on *Kahoot!*[3] in order to practice language skills. Creating a new game involves collaboration, creativity, and communication.

- Students can practice language independently using Duolingo, which has also recently added a classroom feature that allows teachers to track progress for both individuals and groups of students. Dr. Michele Lowers, teacher at Keystone Oaks High School near Pittsburgh, has noted that many of her high school Spanish students use Duolingo to practice their Spanish outside of class.

- Dr. Lowers' Spanish I-V students use the STEAM room there for a wide variety of activities, including individual online courses, video-making, visual art and music integration with Spanish language learning, collaboration in student meeting spaces, and various projects using 1:1 tablet computers. Keystone Oaks received a large grant for their STEAM room, and Dr. Lowers has found that there are endless possibilities for using the facilities and materials there for language teaching.

No matter what the grade level or target language, STEAM-based and project-based learning activities are relevant to kids' 21st century lives. These projects foster student motivation and self-direction, and are open to a wide variety of student interests and passions. A student who loves to create music videos or YouTube-style how-to videos about a favorite topic can be equally at home in the STEAM classroom as a student who loves programming computers and building robots. Even many of young students today enjoy creating these types of projects and doing these types of activities in their spare time.

A smart move is to ask the students in your classroom at the beginning of the year which types of things they enjoy. A simple interest inventory at the beginning of the year can offer a wealth of fresh and motivating ideas for each group of students. Which apps and technology do the students most like to use? How do they use them? Which types of hands-on projects do they like to do? How do they share what they make with others? With a little creativity, world language teachers can find ways to integrate these passions and trends into relevant language-learning experiences.

Many decades ago, President Dwight D. Eisenhower wisely said, "Neither a wise man nor a brave man lies down on the tracks of history to wait for the train of the future to run over

[3] See https://getkahoot.com/ to get started.

him." The STEAM train is here, and world language learning fits in beautifully when we think about how language is the track that will carry us through our 21st century world.

Dr. Michele Lowers and Dr. Maggie Broderick presented on STEAM and World language Education at the PSMLA conference and IUP Spring Methodology Conference in 2016. For more ideas on STEAM and world languages, or to share your own creative ideas for using STEAM Education in the world language classroom, visit our wikispace!

References

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