# ROBOTS
## as
# LANGUAGE LEARNING TOOLS

*by Ericka Collado*

Robots are machines that resemble different forms, usually those of humans or animals, that can perform preprogrammed or autonomous tasks (Robot, n.d.). With the emergence of STEM programs, there has been a rise in the use of robots in educational settings. STEM programs are those where students study science, technology, engineering and mathematics collectively (U.S. Department of Education, n.d.). Robots are considered a staple of STEM programs because the building and use of these tools seemingly incorporate all content areas of STEM seemingly (STEM Center USA, 2015). On the other hand, STEAM programs aim to fill the gap STEM programs may leave by bringing the liberal arts into the mix. In this approach, science and technology are interpreted through engineering and the arts, with a foundation in mathematics (STEAM Education, 2015).

World language classes can positively impact STEAM programs by incorporating elements of robotics. As defined by Bers (2008), a robotics manipulative is a "medium for engaging young children in developing technological fluency and learning about math and science through integrated curricula in a fun and playful environment" (p. 69). Through her research, Bers (2008) has successfully developed robotics kits for children in early childhood programs. Using Bers (2008) definition of robots as a basis, the author expands this definition and applies it to world language teaching and learning. Accordingly, robots may be defined as interactive tools that promote skills such as vocabulary building, critical thinking, and collaboration, while supporting STEM subjects and providing a lens into the culture of the target language. To illustrate this statement, a list of robots along with a brief description and uses in the world language setting is provided below.

## WINDUP TOYS

Windup toys are traditional toys that might not be seen as a robot. But they are! As a matter of fact, they were called automatons, another word for a robot, when first created back in the fifteenth century. They were originally made for adults, particularly those members of the royalty because they were sophisticated and expensive. They were the brainchild of German inventor Karel Grod. He created a metal fly that would buzz around the room and return to his hand. Later, painter Leonardo Da Vinci built a mechanical lion as a gift for Louis XIII of France (Wulffson, 2014). Two other legendary creations were a life-size mechanical girl named Franchina, created by Rene Descartes, and a clockwork boy known as "the Writer," built by Jean Pierre Droz (Wulffson, 2014).

By the nineteenth century, the creation of these hand-made robots declined and was replaced by machine made windup toys made of tin or plastic (Wulffson, 2014).

Windup toys are appropriate for children learning languages in preschool. It is ideal for introduction and reinforcement of vocabulary based on a culturally authentic song or story (Curtain & Dahlberg, 2016). For example, the teacher can sit in a circle with a group of eight students or less after reading or viewing a story such as "El Ratoncito Pérez" (Guiainfantil.com, 2017). Then, the teacher could give each student a windup toy that represents a character in the story and elicit comments from the students using the teaching strategy known as Total Physical Response, or TPR (Curtain & Dahlberg, 2016).

## BLUE BOT

The Blue Bot is the newer version of the Bee Bot, a robot designed for young children meant to teach sequencing, estimation, and problem solving while increasing engagement (Terrapin Software, 2016). Besides the ability to light up while moving due to its see-through design, the Blue Bot has Bluetooth capabilities which allow the user to control it remotely using a tablet (Terrapin Software, 2016). The students can program the robot by using arrow keys to move forward, back, right or left. Once programmed, and after the GO

key has been pressed, the Blue Bot moves in the desired direction. These robots work best when used along with the mats. This accessory provides a surface on which the Blue Bot can move effortlessly in addition to having squares scaled to represent one motion of the robot (Terrapin Software, 2016).

The Blue Bot is perfect for introducing the alphabet, reinforcing spelling, playing word games, and teaching directions, numbers, and vocabulary in general. The grid can be filled with print-outs of letters, words or pictures based on the thematic unit being studied. In two classes of third grade Spanish, the author printed out the letters of the alphabet. Next, the cutouts were placed on the grid in a sequence. In addition, a cutout with the word "SALIDA" representing the "START" button was placed on the mat. After introducing the phrases in Spanish for the different commands of the Blue Bot, the students worked collaboratively to discover a mystery word. In groups of three, each student took turns to read the code in Spanish, listen to the code and program the Blue Bot, and write the resulting letter until finding the mystery word. In a subsequent lesson, each student wrote a code in Spanish to spell their name and shared with their classmates. In this project, third graders helped each other in coding the Blue Bot, discussed the possibility that there could be more than one solution to solve one problem (as there were multiple codes to spell a word), reviewed mathematics, and were engaged throughout the lesson. One recommendation might be to have several sets of the Blue Bot and mats so that students can work individually or in small groups. A good ratio is less than four students per robot/mat set.

## OZOBOT

The Ozobot is a miniature robot that can be programmed to recognize patterns, colors, and codes through an automatic detection functionality (Ozobot & Evollve, 2016). It was created in 2012 by Evollve, a company that creates tools that promote social interac-

tion, computational thinking, and interactive games for children (Crowdfunder, 2016). The Ozobot gives teachers the opportunity to introduce coding in their classes through individual or group projects. The Ozobot Starter Kit comes with a set of codes, stickers and skins, markers and activities (Ozobot & Evollve, 2016). The benefit of the Ozobot is its user-friendliness. Within minutes, the user can create a code by tracing an illustration on regular paper and using markers that the Ozobot can follow. The student can also download the App and use a tablet, program the robot through the drag and drop blocks of code, and interact remotely with other users (Ozobot & Evollve, 2016).

In the world language classroom, the Ozobot is best suited for storytelling projects. The code sheets included in the starter pack can be translated by the teacher from English to the target language and taught as an introductory lesson. In a couple of tryouts, the author used the Ozobot to illustrate the tourist routes in Puerto Rico by tracing different codes on a blank map of the island. Different codes were assigned to each route using markers, to make a distinction between the routes based on their characteristics. For example, the Ozobot was programmed to make zigzag movements when passing through the area where most mountains are located. A description of the routes was recorded in the target language at the same time that the Ozobot moved around the map. In another test, a fourth grade student used the Ozobot to outline holidays in his favorite month. The student created a monthly calendar and video recorded the robot highlighting his favorite celebrations in the month while he narrated it in Spanish.  The Ozobot can be used for problem-solving activities as well where students create a code to get to different points on a map or scavenger hunt activities, where the codes serve as clues to find hidden messages.

## MINI DRONES

Drones are a type of aircraft piloted by

remote control, hence the name unmanned aerial vehicles (UAVs) (Federal Aviation Administration [FAA], n. d.). These flying robots are quickly growing in popularity for recreational activities as well as in educational settings. Therefore, the Federal Aviation Administration established guidelines to assist educators in the integration of drones. These guidelines outline that the students may operate drones as part of a lesson while the teacher helps them in its operation (Federal Aviation Administration, n.d.). It is worth noting that, the FAA does not regulate the indoor flying of mini drones. Nevertheless, it is equally important to follow safety procedures when integrating them into lessons.

In the book Drones in Education (Carnahan, Zieger & Crowley,  2016), the authors share the S.O.A.R. Model as a framework that each educator should follow when integrating drones in the classroom. S.O.A.R. stands for: safety, operation, active learning, and research. Safety must be the priority when using a drone. Although the FAA may not regulate the indoor use of drones, the teacher must be mindful of drone proximity to students, furniture, and air conditioning vents that may influence the drone performance, just to name a few challenges. Since drones are sophisticated technologies, it is crucial that the educator learns how to operate them well before teaching the students to troubleshoot any issues that come up. Active learning is an important component of this framework. Therefore, teachers must assure that the use of the drone fosters engagement and participation through interactive tasks. Finally, the instructor must be familiar with the latest research and current practices in the field to guarantee successful implementation (Carnahan et al., 2016).

The beauty of the integration of drones in the world language setting lies in the possibility to incorporate an emerging technology, combined with culturally-thematic lessons (Curtain & Dahlberg, 2016) and real-world tasks. Currently, news about companies using drones to deliver goods is released in the media on a regular basis. The corporation JD.com in China uses drones to deliver packages (Aleem, 2017), Pizzeria Francesco delivers pizza in Mumbai (n.a., 2014), while in Cantabria, Spain, the coffee shop Currus & Co. is awaiting permits to become the first bakery to deliver bread using drones in the world (Coquillat, n.d.). These articles are written in the target language of the country where the event took place. They can be appropriately used by world language teachers

*In addition to being culturally thematic and providing a chance for students to practice conversational skills, incorporating a chatbot hosted online crosses that fine line between reality and fiction that makes a lesson magical.*

as authentic texts to teach comprehension strategies, as well as cultural perspectives and practices.

In a culturally thematic unit the author is developing on drones, the story of Currus & Co. can be used as a basis for the lesson. Using the mini drone Mambo developed by Parrot (2017), students of Spanish engage in a role-play exercise where they act as the coffee shop employees and customers. For example, one student takes the order by phone, and another student fulfills the order by selecting paper cut outs with pictures of the bread, or the names written on a piece of paper, glued to a craft stick. Then, using the grabber tool attached to the mini drone, it is flown to a destination that represents the house of the customer who placed the order. Both the Mambo and Rolling Spider drone models (Parrot, 2017) have been used by the author in trial activities to introduce vocabulary to describe locations within a room, as well as the different movement a drone performs. Likewise, problem-solving tasks can be easily included in drone flying lessons. Real world issues, like legislation over civil drone use in Europe, could lead to mock meetings with the European Aviation Safety Agency in Spain where representatives examine the possibilities of allowing business to fly drones (European Aviation Safety Agency, n.d.). The students could write persuasive essays that support the drone flying in areas currently restricted. Another use of drone flying as a cultural theme is fantasy trips (Curtain & Dahlberg, 2016). These trips are traditionally carried out with the idea of boarding an airplane and traveling to another country. Due to the amount of drone flying videos available on YouTube (2017) from countries around the world, the teacher can easily incorporate these as interpretive viewing and listening activities that set the tone for the subsequent drone flying tasks.

## CHATBOTS

A chatbot, also known as chatter bot or conversational agent, is a computer program that simulates human conversation and generates a representation using an image of a human, animal, or other creature. It is programmed by a developer to ask and respond to questions or statements using voice or text (Chatbots.org, 2017). It dates to the year 1966 when scientist Joseph Weizenbaum at the Massachusetts Institute of Technology created the first-ever chatbot named Eliza (Mullins, 2005). Eliza was programmed to mimic a psychotherapist and paraphrase the statements of patients in the form of questions. Consequently, chatbots continued to evolve

along with research in artificial intelligence. Just like drones, chatbots are a technology that serve as a window into the culture of the target language country. Take, for instance, Luigi, the virtual assistant in Fiat-Argentina who chats with prospective customers through Facebook (Cutuli, 2013).

In a blended learning project with fifth-grade students, the author created a chatbot called "Don Quijote" embedded within a virtual classroom, with whom students engaged in a conversational practice using the online platform Rebot.me (2015). This online platform is free of charge and allows the subscriber to upload a picture representing the chatbot and assigned it a name. The chatbot is then programmed by typing questions that the students interacting with the chatbot may ask, and answers to the questions. In the f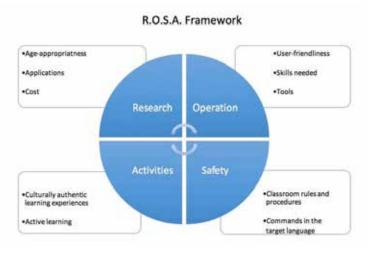ifth grade project, students were asked to use questions previously learned in class. After typing their question, the chatbot would show the pre-programmed answer and perhaps ask a question to the student. In addition to being culturally thematic and providing a chance for students to practice conversational skills, incorporating a chatbot hosted online crosses that fine line between reality and fiction that makes a lesson magical. Although students recognized that they were conversing with a robot, they were intrinsically motivated to create with language to keep the conversation going with "Don Quijote." Teachers that desire to create chatbots can incorporate them through an ongoing basis and update the repertoire of questions and phrases the chatbot regularly uses so that it matches the progress of the students.

The use of chatbots can also be aligned with with culturally thematic planning (Curtain & Dahlberg, 2016) by using an existing chatbot like Luigi from Fiat in Argentina (Cutuli, 2013). The students can read the Facebook page posts as part of an interpretive task, followed by the creation of their chatbot in the target language as a presentational task, in this case, Spanish, and then engage in conversation with the chatbots created by their classmates as a culminating interpersonal task. Although the conversational skills of the chatbot might be limited to the pro-

grammed phrases, it provides the element of spontaneity to the conversational experience of the student since s/he does not know for sure what the chatbot will ask or answer.

Undoubtedly, traditional and emerging robots such as windup toys, the Bluebot, Ozobot, mini drones, and chatbots are technological tools that support proficiency growth in world language classes, through interactive communication and culturally-thematic lessons, while supporting the STEAM curricula. However, they may require more careful consideration than the average foreign language teaching props. Given this, the R.O.S.A. framework has been developed by the author, based on the S.O.A.R. Model and with permission of the authors (Carnahan et al., 2016). R.O.S.A. is an acronym that stands for research, operation, safety, and active learning as it relates to foreign language teaching



R.O.S.A. Framework

- Age-appropriateness
- Applications
- Cost

Research

Operation

- User-friendliness
- Skills needed
- Tools

Activities

Safety

- Culturally authentic learning experiences
- Active learning

- Classroom rules and procedures
- Commands in the target language

and learning. R.O.S.A. (http://www.erickacollado.com/rosa.html), which means rose in more than one language, is intended to provide teachers with a criterion to assess the feasibility of the integration of the robots in their classes. Through the use of R.O.S.A, the author aims to encourage world language teachers to research the desired robot before purchasing it, regarding applications that are conducive to activities in the target language, cost and age appropriateness. Secondly, it is important that the instructor learns to operate the robot well before showing the students in order to maximize its use during the lessons. Thirdly, the teacher must develop a set of classroom rules, procedures, and commands in the target language for students to follow when using the robots. Finally, the robot-based lessons must be aligned to culturally authentic learning experiences and support active learning in the three modes of communication for students to have a successful experience.

# WORKS CITED

Aleem, Z. (2017, May 26). The chinese version of amazon is already using drones to deliver stuff to customers. *Vox.* Retrieved from https://www.vox.com/world/2017/5/26/15677522/jd-amazon-drones-china-bezos

Bers, M.U. (2008). Blocks to robots: Learning with technology in the early childhood classroom. New York, NY, United States: Teachers College Press.

Carnahan, C., Zieger, L. & Crowley K. (2016). Drones in education: Let your students' imaginations soar. Arlington, VA, United States: ISTE.

Chatbots.org. (2017). *Chatbot.* Retrieved from https://www.chatbots.org/chatbot/

Coquillat, P. (n.d.). *Un pan bajo un dron.* [A bread under a drone]. Retrieved from http://www.townfeeling.com/un-pan-bajo-un-dron/

Crowdfunder.(2016). *Ozobot by evollve inc.* Retrieved from https://www.crowdfunder.com/ozobot

Curtain, H. & Dahlberg, C.A. (2016). Languages and learners: Making the match. Boston, MA, United States: Pearson.

Cutuli, S. (2013, May 3). *Luigi, el asistente virtual de fiat auto argentina cumplió un año.* [Luigi, fiat auto argentina's virtual assistant turned one.] Retrieved from http://www.cosasdeautos.com.ar/2013/05/luigi-el-asistente-virtual-de-fiat-auto-argentina-cumplio-un-ano/

European Aviation Safety Agency. (n.d.). *The agency.* Retrieved from https://www.easa.europa.eu/

Federal Aviation Administration. (2016). *Memorandum.* Retrieved from https://www.faa.gov/uas/resources/uas_regulations_policy/media/interpretation-educational-use-of-uas.pdf

Federal Aviation Administration. (n.d.). *Unmanned aircraft systems.* Retrieved from https://www.faa.gov/uas/

Guiainfantil.com. (2017). *Ratoncito Pérez. Cuentos tradicionales para niños.* [Little mouse pérez. Traditional tales for children.] Retrieved from https://www.guiainfantil.com/servicios/Cuentos/RatoncitoPerez.htm

n.a. (2014, May 26). Mumbai's francesco's pizzeria delivers pizza using a drone. *The Economic Times.* Retrieved from http://economictimes.indiatimes.com/slideshows/biz-entrepreneurship/mumbais-francescos-pizzeria-delivers-pizza-using-a-drone/pizza-delivery-using-a-drone/slideshow/35614791.cms.

Ozobot & Evollve, Inc. (2016). *Ozobot.* Retrieved from http://ozobot.com/

Parrot SA. (2017). *Minidrones.* Retrieved from https://www.parrot.com/us/MINIDRONeS#minidrones

Rebot.me. (2015). *Don Quijote de la Mancha.* Retrieved from http://rebot.me/don-quijote-de-la-mancha

Robot [Def. 1a]. (n.d.). *Merriam-Webster Online.* In Merriam-Webster. Retrieved June 26, 2017, from https://www.merriam-webster.com/dictionary/robot

STEAM Education. (2015). Faq. Retrieved from https://steamedu.com/about-us/faqs/

STEM Center USA. (2015). *Why robotics?* Retrieved from http://www.stemcenterusa.com/stem-robotics/why-robotics/

Terrapin Software. (2016). *Bee-bot in school.* Retrieved from https://www.bee-bot.us/

U.S. Department of Education. (n.d.). Science, technology, engineering and math: Education for global leadership. Retrieved from https://www.ed.gov/stem

Wulffson, D. (2014). *Toys! Amazing stories behind some great inventions.* [Google Play version]. NY, United States: Square Fish.

YouTube. (2017). *Drone tourism videos around the world.* Retrieved from https://www.youtube.com/results?search_query=drone+tourism+videos+around+the+world

**Dr. Ericka Collado** is a Spanish teacher in grades 3-5 at Dwight-Englewood School and an adjunct professor in the Modern Languages Department at New Jersey City University. She holds a Master's degree in Urban Education with specialization in World Languages, and a Doctorate in Educational Technology Leadership, both from New Jersey City University. An advocate for foreign language instruction, Dr. Collado regularly facilitates workshops on thematic planning, curriculum development, classroom management and technology integration. Her research interests include instructional methods and design, blended learning environments, and robots.