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Virtual Tabadul: Creating Language-Learning Community Through Virtual Reality

Melissa Baralt
Florida International University, U.S.[1]

Stephanie Doscher
Florida International University, U.S.

Lakhdar Boukerrou
Florida International University, U.S.

Biayna Bogosian
Florida International University, U.S.

Wessam Elmeligi
University of Michigan-Dearborn, U.S.

Youcef Hdouch
Ibn Tofail University, Morocco

Jamil Istifan
Florida International University, U.S.

Abdelhak Nemouch
Larbi Ben M'hidi University Oum El-Bouaghi, Algeria

Taron Khachatryan
Knoxlabs, U.S.

Noha Elsakka
Florida International University, U.S.

Fernando Arana
Florida International University, U.S.

Giancarlo Perez
Florida International University, U.S.

Jonathan Cobos-Solis
Florida International University, U.S.

Salah-Eddine Mouchane
Florida International University, U.S.

Shahin Vassigh
Florida International University, U.S.

ABSTRACT

This article presents on a multi-institution project that explains the design and development of Virtual Tabadul, an Arabic and English foreign language exchange program amongst 1,200 U.S. and Middle East and North Africa (MENA) college-aged youth. The program involves faculty, staff, and students at four institutions: Florida International University (U.S.), University of Michigan-Dearborn (U.S.), Oum El-Bouaghi University (Algeria), and Ibn Tofail University (Morocco). The project has been developed with generous funding from the Stevens Initiative and is the very first virtual exchange program for Arabic and English foreign language learning in virtual reality.

Keywords: 5-8 words, separated by commas

In this article, we explain how our team of U.S., Algerian, and Moroccan educators, researchers, entrepreneurs, and scientists created Virtual Tabadul, a multi-institutional virtual exchange program embedded in virtual reality (VR) for English and Arabic foreign language learning. We describe how we have collaborated across disciplinary, cultural, and intra- and inter-institutional contexts to develop the VR scenes and curricula. We also detail how we have overcome significant hurdles and navigated partnership dynamics for the purpose of promoting a scalable and sustainable virtual exchange program. As our program is still ongoing, we do not report on student learning and other impact outcomes here. Rather, our aim is to provide a rich description of our experience designing and developing this program to help those working at the pedagogical and technological edges of virtual exchange to bridge obstacles to innovation.

INTRODUCTION

In 2020, The Stevens Initiative released a call for grant applications to fund virtual exchange projects for the areas of science, technology, engineering, and mathematics (STEM), education, and language learning, among others. The Stevens Initiative is a U.S.-based international effort to build global competence and career readiness skills for young people in the U.S. and MENA region via virtual exchange. It is sponsored by the U.S. Department of State with funding provided by the U.S. Government and is administered by the Aspen Institute. It is also supported by the Bezos Family Foundation and the governments of Morocco and the United Arab Emirates. The growing need for innovation in Arabic and English language instruction drove us to apply for a grant, which was eventually funded, to create Virtual Tabadul, an immersive language and culture learning experience in virtual reality. We proposed to facilitate virtual exchange amongst 1,200 college-aged youth in the U.S., Algeria, and Morocco over a three-year period, utilizing the latest theoretical and empirical advancements in the fields of applied linguistics to maximize second language acquisition. We would do so by embedding virtual exchange in virtual reality spaces for Arabic and English, following a task-based language teaching approach. To understand why we developed this program, it is helpful to reflect on the sociolinguistic status of these two languages in our countries.

The Need to Innovate in Arabic Teaching and Learning in the U.S.

Arabic is now the seventh most commonly spoken non-English language in the U.S., making it the fastest growing language spoken in the nation (Brown, 2016). Despite this, in 2015 it was reported that less than 1% of college students in the U.S. study Arabic (Goldberg, Looney, & Lusin, 2015). This is surprising given that Arabic is the official language of 22 countries in the Middle East and North Africa (MENA) region and has 300 million speakers (Sayed, 2015). Arabic is a Category IV language that is described by the U.S. Foreign Service Institute (n.d.) as exceptionally difficult for native English speakers, with an estimated 2,200 hours of study necessary to develop working proficiency. The Arabic language is also described by the U.S. National Security Education Program (n.d.) as critical to U.S. national security, rendering it an essential need. Unfortunately, there is a dearth of research on the best ways to teach Arabic as a foreign language in the U.S., and very little research on teacher support for implementing Arabic language teaching to promote communication.

Complicating the situation further, every Arab country has *diglossia*, a language situation in which "Standard Arabic" is used in formal contexts across the Arab world while in everyday life contexts, speakers use their own local Colloquial Arabic linguistic varieties (Albirini, 2015). Thus, to learn Arabic, U.S. students must have an awareness of this sociolinguistic context and teachers must know how to effectively teach Modern Standard Arabic while also acknowledging, and ideally teaching, local linguistic varieties. Research into how to address this methodological challenge is much-needed given recent calls for

more communicative approaches to Arabic foreign language teaching in the U.S., particularly in university contexts (e.g., Abdalla & Al-Batal, 2011; Al-Mohsen, 2016).

The Need to Innovate in English Teaching and Learning in Algeria and Morocco

Innovation is also needed for the teaching of English as a foreign language in the countries of Algeria and Morocco. While the grammar-translation method is omnipresent in both countries, the sociopolitical background and need for English is quite different. Algeria is currently experiencing a decolonization of language learning. Since the country's independence from France in 1962, an Arabization process has been initiated to make Arabic the primary language of school instruction. Today, the debate is no longer about how to make Arabic the mainstream language, but whether French (which was inherited from 130 years of colonization and has a unique status as a second language) should be replaced with English. In practice, and following the failure of Arabizing some scientific sectors, the French language is still dominant in Algeria in STEM disciplines. For political reasons, and as a matter of national identity and national pride, Algerian policy makers are embarking on a process of deemphasizing French and promoting English. Algerian universities are investing in teacher training and developing STEM programs in English.

The Moroccan linguistic landscape is similar to the Algerian one, though Morocco has a different history and relationship with France. Morocco's National Charter of Education and Training is pushing for Arabic as the national language and emphasizing foreign language teaching and learning, including French and English. Thus, while Algeria's shift in language learning is driven by national identity and STEM advancement, Morocco's shift is driven by young people who see English as an international language imperative for employment and accessing knowledge. Families are sending their children to English language centers at an early age, which is a new practice in Morocco. Morocco's Minister of Research and Higher Education, Driss Ouaouicha, was recently quoted as saying, "With young people favoring English as their preferred foreign language, the task of gradually shifting to English in Morocco can only benefit research and education" (Hamann, 2021, para. 27). Young people in Morocco have also been reported to have a positive association with English. A recent study found that 82% of Moroccan youth indicated a preference for English, while only 59% have positive associations with French (British Council, 2021). In sum, although there is profound interest in learning English as a language of training and communication, there is a paucity of research on the best approach to teaching English given the Algerian and Moroccan sociopolitical context.

OUR THEORETICAL MODEL

The overarching aim of Virtual Tabadul is to innovate Arabic foreign language teaching in the U.S. and English foreign language teaching in Algeria and

Morocco. In this section, we describe the theoretical model upon which our program is based. We then detail the cross-cultural contexts, partner positioning, and partnership dynamics, as well as the institutional agreements that we are employing to create scalable and sustainable virtual exchange for language learning.

Virtual Exchange

Virtual exchange is a "technology-enabled educational tool that facilitates people-to-people learning sustained over a period of time. It entails the use of technology to bridge students across cultural and geographic boundaries and from different contexts" (Helm, Guth, Shuminov, & Van Der Velden, 2020, p. 93). In the field of language learning, virtual exchange has been done in two ways: E-tandem, where two students come together to practice the target language or languages, and telecollaboration, where entire classrooms integrate with other classrooms via online interactions (O'Dowd, 2020). Both models are supported by interactionist and sociocultural approaches to adult second language acquisition.

In the field of language learning, virtual exchange has recently been criticized for engaging students in superficial encounters in which they simply compare and contrast each other's cultures while using the target language (Byram, 2008). As a result, Byram (2008) put forth a "Framework of Intercultural Citizenship," where language-learning tasks in virtual exchange move from what he calls the pre-political to the political (e.g., learners engage with each other and then go on to reflect critically on their preconceived beliefs and ways to take action to instantiate change in society). O'Dowd (2020) expanded upon this, arguing for a transnational model of virtual exchange global citizenship education. In explaining that e-tandem and telecollaborative approaches to virtual exchange treat students as "passive observers and collectors of cultural information" (p. 483), O'Dowd (2020) proposed that virtual exchange set students up to achieve greater understanding of others' views and to solve local and global problems as active contributors in their communities.

Taking our cue from O'Dowd's (2020) model, Virtual Tabadul engages students in problem-solving in their local community by consulting with them to determine their target language learning needs and problems in their community that merit improvement. Language learning is designed to happen as a result of becoming a global citizen; with Virtual Tabadul, students achieve language proficiency by completing real-world tasks that promote global awareness and that serve their community.

Task-Based Language-Learning in Virtual Reality

With Virtual Tabadul, we expand upon O'Dowd's (2020) model for virtual exchange by taking a *task-based approach* to communicative language learning and teaching within the transnational model of virtual exchange global citizenship education. Task-Based Language Teaching (TBLT) is an approach that has been

widely implemented in the field of language teaching methodology for the last few decades. TBLT aims to set learners up to do real-world and daily-life tasks in the target language, equipping them with skills that are based on their real-life needs (Nunan, 1989, 2005; Robinson, 2011; Long, 2005, 2015). TBLT is supported by theories that postulate that learners must create their own meaning in the language, interact creatively with other speakers of the language, and produce output in order to learn (Baralt & Morcillo Gómez, 2017; Ellis, 2003; Long, 2015). In TBLT, learners work on their own or with partners to produce an outcome while using the target language to complete a pedagogic task following a similar real-life scenario (Brandl, 2017). Crucially, any curriculum that follows a task-based approach must be based on students' needs. This mandates consulting with the learner population and conducting a needs analysis (see Long, 2005, for details on needs analysis methodology) to then design the entire curriculum as based on their real-world needs for the target language. TBLT fully informs Virtual Tabadul's curricular design and methodology.

Virtual reality

In order to create the most meaningful virtual exchange opportunity for Arabic and English language learners, we proposed to do so in virtual reality (VR). VR is an immersive technology that "enables social interaction by simulating real-world contexts and promoting student learning through active and self-exploratory discovery processes" (Li & Jeong, 2020, p. 6). It is an ideal platform to promote language learning because students can have embodied experiences as they carry out real-world tasks in the target language. Recent theoretical advancements articulate that language learning is enhanced by whole-body engagement within the VR visuospatial environment. New theoretical notions argue that doing tasks in the VR setting might even be better than traditional classroom approach: the embodied experience might enhance long-term memory of the new language to experienced objects and actions (Li & Jeong, 2020). Recent research supports the theory that the interactive and immersive nature of VR fosters students' deep learning and long-term retention (Rizzo et al., 2006) and makes learning more motivational and enjoyable (Apostolellis & Bowman, 2014). In two studies, language learners who performed tasks in VR needed only half of the number of exposures to achieve the same level of proficiency as language learners who followed traditional learning methods (Hsiao et al., 2017; Lan et al., 2015). Li and Jeong (2020) have called this the *Social Brain of Language Learning*, or *SL2 Framework*, i.e., where VR is argued to promote situated language learning through "real-world experiences and visuospatial analyses of the learning environment" (p. 6) that a traditional classroom cannot provide.

Figure 1 depicts the theoretical tenets of Virtual Tabadul and how the project is designed to advance knowledge within these frameworks.

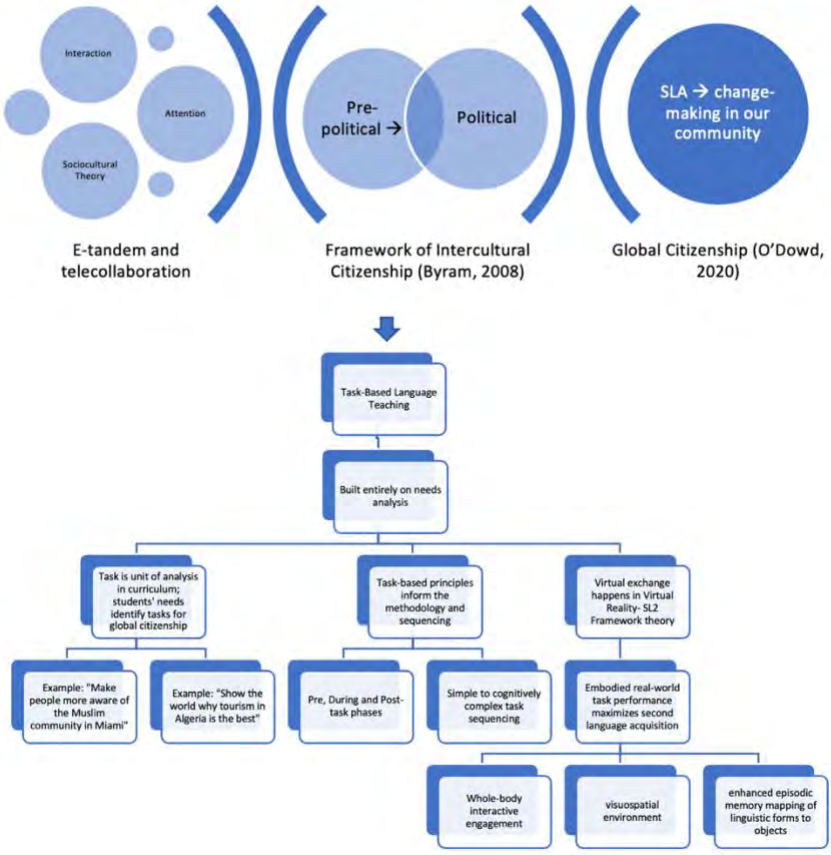

Figure 1: Theoretical Model of Virtual Tabadul

VIRTUAL TABADUL: WHAT IT IS AND HOW IT WORKS

We now briefly explain how Virtual Tabadul works. First, students enrolled in Arabic foreign language classes at the U.S. university partners and students enrolled in English foreign language classes at the MENA-region university partners are invited to participate. The research team pairs students and emails each pair a personalized email with instructions on how to contact each other, how to self-enroll in the free Canvas Learning Management System (LMS) that houses the task instructions, and how to take the pre-program assessments anonymously. Students then contact their assigned language partner and together the pair decide when to meet over the semester for their virtual exchange sessions.

Virtual Tabadul involves carrying out 12 virtual exchange sessions total, for which they meet online via Zoom and then access the VR spaces on their cell phones using Google Cardboard viewers. For each virtual exchange session, students perform real-world tasks together in the VR space. Each exchange session is presented in the free Canvas LMS as a module unit; this is also where students submit their assessment tasks. Tasks range from talking about family and ordering food, to raising awareness about the Muslim community in Miami, Florida, to teaching the world about tourism in Algeria. The VR spaces also represent everyday scenes in the U.S., such as a university classroom in Miami and an Arab bakery in Dearborn, Michigan, and in North Africa, such as an outdoor market in Morocco and a tourist site in Algeria.

Task-Based Methodological Structure

In the pre-task phase, students explore icebreaker questions in Zoom, getting to know one another and establishing friendship. This is supported by research that demonstrates that friendship, socialization, and the formation of trust are crucial for language learning online, particularly during video-based interaction (Baralt, Gurzynski-Weiss & Kim, 2016; Gleason, 2013; Stickler & Shi, 2013; Van der Zwaard & Bannink, 2014). Importantly, and so that students get practice in both of their target languages, each session is done half in Arabic and half in English. The instructions in Canvas articulate this for students; students are also given pre-meeting 'warm-up' phrases and suggestions to prepare them for the virtual exchange meeting. They are also given tasks or asked questions that serve as cognitive preparation for the during-task phase.

In the during-task phase, students are instructed to put their phones into their Google Cardboards and enter the VR space. They converse over Zoom, working together with their partner to perform the task sequences. In order to do so, they must discover the audiovisual clues embedded in the VR space, such as a Moroccan student's Tik Tok video in Arabic, or an audio clip of a conversation between a mother and her child speaking in Arabic and English. To see the clues, students move their bodies and then hover over numbers and objects in the VR space with their cellular device in the Google cardboard to activate the clue. After students activate and fully experience each clue, a badge appears in the VR space dashboard to indicate progress; students are able to repeat the clues as many times as needed and they know that they have found each clue once their dashboard badges all appear.

Students then move on to the post-task phase, where they might have to do a task repetition, reviewing the clues that were found together, and a related taskette, such as discussing what felt familiar in the scene or related community problems and how they can be addressed. This phase is followed with task-based assessments that students submit individually. U.S. students are instructed to submit their outcome tasks in Arabic, while the MENA-region students submit theirs in English. In Figure 2 below, we show one of the VR spaces that our team created. This is Timgad, Algeria; the hover icon is what activates the embedded

clues, and the progress dashboard (with badges featuring the Virtual Tabadul logo) is seen at the top:

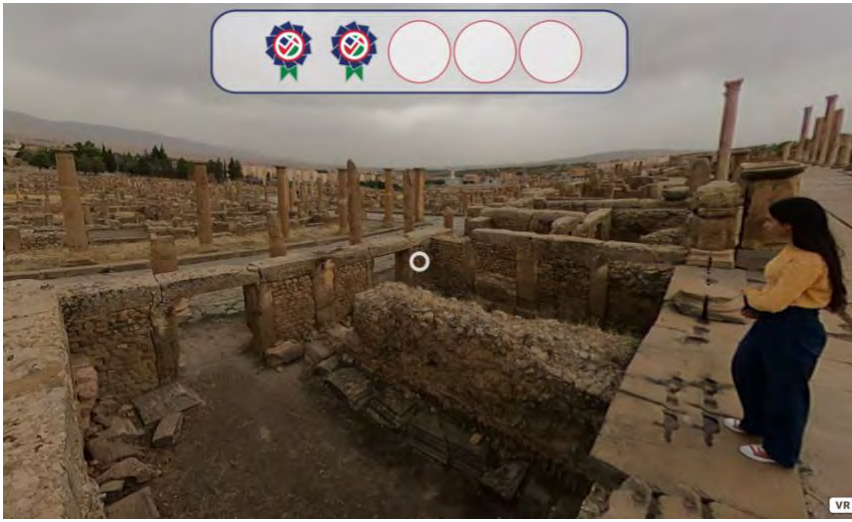

Figure 2. One of the Virtual Tabadul VR Spaces in Timgad, Algeria

How We Set Up International Collaboration Among the Design Team Members

True collaboration is an "interactive process that engages two or more participants who work together to achieve outcomes they could not accomplish independently" (Salmons, 2019, p. 5). Collaboration requires purposeful facilitation, equal power relationships, and clearly articulated instructions and work plans. Florida International University's (FIU) extensive experience with virtual exchange made evident from the outset that students' ability to collaborate would be strongly influenced by the extent to which faculty and partners collaborated in the design of Virtual Tabadul, so the team adhered to principles of collaborative design from the grant proposal stage onward. Once our project was funded, the entire instructional design team was invited to participate in the June 2021 FIU Collaborative Online International Learning (COIL) Design Workshop, which engaged a cohort of faculty partners spread across four continents in the process of designing COIL modules for implementation in fall 2021 or thereafter. The COIL Design Workshop is run as a COIL, with participants experiencing activities that their students experience during their virtual exchange. Ideas that emerged during the workshop were then shared with other work group members for critical reflection and input. Over time, iterative, multipartial feedback shaped the design of all aspects of Virtual Tabadul to maximize feasibility, meaningfulness, and inclusion. The team's collective experience of the COIL

workshop set a firm foundation for our ability to collaborate to design and implement Virtual Tabadul over the long term.

Virtual Tabadul has adopted a cascading approach (Edwards, Prætorius, & Nielsen, 2020) by empowering each member of the team as a change leader and coordinating and aligning their contributions to common goals through frequent structured communication and feedback. This begins with the project's principal investigators (PIs), whose skills and experience are complementary and mutually reinforcing and are all critical to the project's feasibility and success. Baralt is the subject matter expert, Doscher the global learning and virtual exchange specialist, and Boukerrou the authority on logistics, budgeting, and MENA partnerships. The other members of the Virtual Tabadul team are divided into three work groups: (1) instructional partners, i.e., U.S. and MENA faculty, graduate research assistants, the Beliefs, Events, and Values Inventory (BEVI) consultant; (2) technological partners, i.e., members of the FIU Robotics and Digital Fabrication Lab (RDF Lab) and Knoxlabs; and, (3) project management partners, i.e., staff responsible for proper conduct of research, grant, and budgeting processes at the Stevens Initiative and all four partner institutions. At least one of the PIs is present at all work group meetings and members of different work groups attend objective-specific meetings.

Partner Positioning

It is important to highlight that every member of the Virtual Tabadul team is equally needed and therefore afforded equal standing in their power to contribute to and influence the project's design and implementation. When it came to the development of Virtual Tabadul, power negotiation in terms of design, cultural contexts, and partner positioning was dictated from the beginning by multipartiality, defined as:

> a 'power-balancing' approach that supports and sustains all voices, especially the subordinates' voices, or the concerns and needs of those with less power (i.e. oppressed groups). It especially supports less dominant groups' challenges to dominant groups' narrative and voices as a way to rightsize the incoming imbalance in perspectives that different groups bring to the table. As a result, the power balancing or multipartial approach, as opposed to a neutral or impartial approach, makes the intergroup dialogue more egalitarian and complete (Fisher & Petryk, 2017, p. 5)

Thus, our multi-institutional partnership started off with this dynamic, centering the teachers' and MENA region partners' voices. To provide an example, the images used to create each VR space were taken from the partners themselves. Each partner (the two U.S. universities and the two MENA region universities) received a 360 camera that creates a VR space, and the teachers and students themselves took the photos, advised on the VR space design, and co-created the asset clues embedded in the VR spaces. The Algerians are thus positioned as the experts on the VR spaces representing their country and ensuring that the

pedagogical tasks to be carried out in those spaces meet students' needs; the Moroccans are the experts on the VR spaces representing Morocco, etc. A consequence of this cascading approach is that knowledge sharing across organizational and disciplinary borders has positively contributed to all work group members' professional growth. For example, we recently held a public-facing round table event where everyone on the team spoke about their contribution and perspectives in the development of Virtual Tabadul. This event can be watched by the public on YouTube.

Partner Dynamics

Virtual Tabadul created two "third spaces" for housing and organizing our work: A Trello board for project management, and the free Canvas course for student engagement. The Trello board (see Figure 3) features a column aligned with all components of the project, e.g., monitoring and evaluation reports, financial reports, collaborations with embassies, VR scene design, student assessment, social media postings, etc. Individual cards within each column are keyed to each task on our timeline and contain hyperlinks to Google drive folders housing all documents and materials.

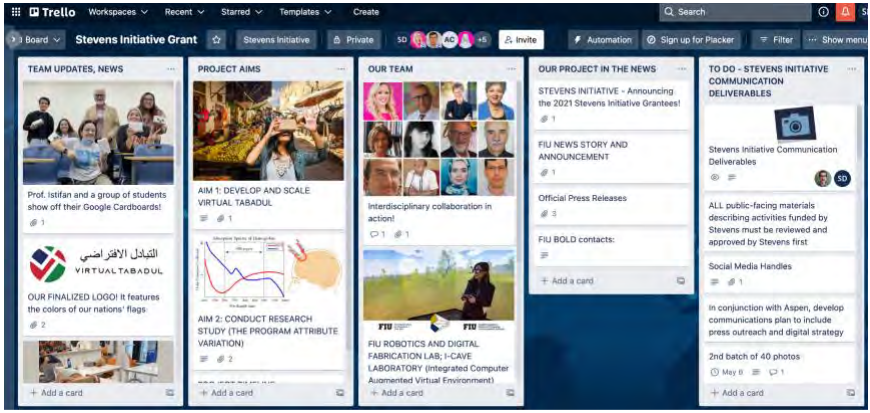

Figure 3. Excerpt of Virtual Tabadul Project Management Trello Board

Our Trello project management site is accessible to all members of the Virtual Tabadul team, and each person is responsible for updating parts of the site. This can also include news and well wishes; for example, one of our Arabic teachers updated the Team News board with a picture of him giving out Google Cardboard to his class; another teacher put up a photo to celebrate Eid. This has been a fun and visually appealing way to keep everyone updated and accomplish key tasks. The free Canvas course site serves as the "home base" for students to locate and

work in all directions, activities, assessments, and resources for Virtual Tabadul. The team decided not to use a learning management system hosted by one of the institutional partners, both because this option was impractical and would undermine equal power relationships if one institution was perceived as the "host" in the application and others as "guests." The organizational structure and ease of use of the Canvas modules have proven critically important for enabling our students, embedded in different time zones, cultures, languages, and geographies, to bridge their differences and connect through web conferencing and VR.

CHALLENGES AND HOW WE ARE ADDRESSING THEM

The Virtual Tabadul project is truly an international collaborative effort, but we faced many challenges due to the project's cutting-edge nature, the number of institutions involved and their locations, and the number of departments involved within the PIs' institution.

Inter- and Intra-institutional Collaboration

Because the international partners already had a relationship with FIU, it was not hard to enlist them as partners in this project. However, one of the most challenging aspects of working across institutions was dealing with differences in rules and procedures at the partner institutions. Creating the virtual scenes from scratch by requesting contributions from all four geographical locations required a lot of coordination to get the appropriate photos and videos. For example, some of the issues with which we dealt included choosing the scenes for each of the countries, driving sometimes long distances to take the photos, and getting permission to use and film in the spaces.

Timing has been another challenge. Algerian and Moroccan partners are not on the same schedule as the U.S. partners. This difference was exacerbated by the COVID-19 pandemic, which caused numerous lockdowns, changes to course delivery methods and course schedules, and delays in starting dates, necessitating continuous adjustments to our initial plans. Administrative procedures have been another major challenge. For example, members of our team at the PIs host institution are from five different colleges and multiple department units, ranging from our School of International and Public Affairs to Architecture to Biomedical Engineering. Coordinating onboarding, purchasing and paperwork across all units with our main grants administration office has required significant time and number of meetings. In addition, it took almost a full year to obtain Institutional Review Board (IRB) approval and received research training required by all parties at the different institutions. Setting up the grant and grant budget, conducting U.S. conflict of interest training and forms, creating subawards to pay partner universities, and completing consultantship documentation required many hours of effort over weeks and months. A considerable number of emails and meetings concerned the documents required to obtain approval from the four partner institutions and to meet unique sponsor requirements, such as providing high-quality photos documenting our project and student media consent forms.

The challenges we faced here mostly concerned how to obtain signatures on documents, considering the cultural differences at play regarding how and why a signature is required. We also faced international requirements, such as frequent contact with the U.S. Embassies in Algiers and Rabat. In the case of Algeria, we were asked to provide additional information beyond what was provided to our funder about the commitment of the university there and additional information about disbursement of funds.

Creating New Technology

The main challenges in creating Virtual Tabadul technology have been in three categories. First was the technical workflow. Virtual Tabadul requires the creation of user-friendly learning environments for 1200 students with diverse backgrounds and technology accessibility, so it was important to reduce technology components to only the essentials: a web-based VR link for the phone, Google Cardboards, and Zoom conferencing. These components maintained the immersive and interactive components of the program. Second was working around the limitations of VR design. We faced a few challenges regarding the types of or clues that we could incorporate into the scenes. For instance, in the current version, it is not possible to replay video clues containing audio. As a workaround, we have separated audiovisual components and synchronized their activation start times to create a seamless immersive experience for users. The third challenge has been how to stay current with software and hardware updates. As Virtual Tabadul's technology requires both software and hardware interdependencies, any system update might break and/or delay the workflow. Constant user testing and communication with all students will be essential for staying up to date. This underscores the value of our constant team-based communications, brainstorming, and ideation.

Making Virtual Tabadul Accessible to All

Right from the start, we designed Virtual Tabadul to provide maximum accessibility within a context of significant constraints. The Stevens Initiative required that all students be able to do Virtual Tabadul using their cellular device. Our program also needed to be cost effective, scalable, and, most importantly, accessible to students in rural areas. Our solution to the affordability and scalability requirement was to make the VR spaces accessible through foldable Google Cardboards (Figure 4), which are made out of low-cost components and are composed of lenses and a conductive material for transferring finger touch to phone screen. Any smartphone running a web browser can be placed inside the Cardboard viewer to enable the user to turn in any direction to experience VR immersion. To enable accessibility, all Virtual Tabadul students receive a Google Cardboard, and all Algerian and Moroccan students receive local timecards to offset Internet costs.

Figure 4. Example of a Google Cardboard Created By Knoxlabs

We envision this program as an open access resource in development and we hope to scale it to more students and countries. This is precisely where VR comes into play. It serves as a powerful example of how technology-enabled and task-based language learning can provide exchange opportunities to language learners who might not otherwise be able to interact with youth in the target language. Free and accessible tools such as Canvas, Zoom, and open-source web frameworks for VR design such as A-Frame are imperative for this goal. We are also grateful for the Robotics and Digital Fabrication Lab at FIU, which has spearheaded this innovation under Bogosian's and Vassigh's direction, as well as Knoxlabs' Google Cardboards, which make immersion into VR spaces a reality. In Figure 4, we visually demonstrate the Virtual Tabadul workflow that we have created in order to bring this project to fruition:

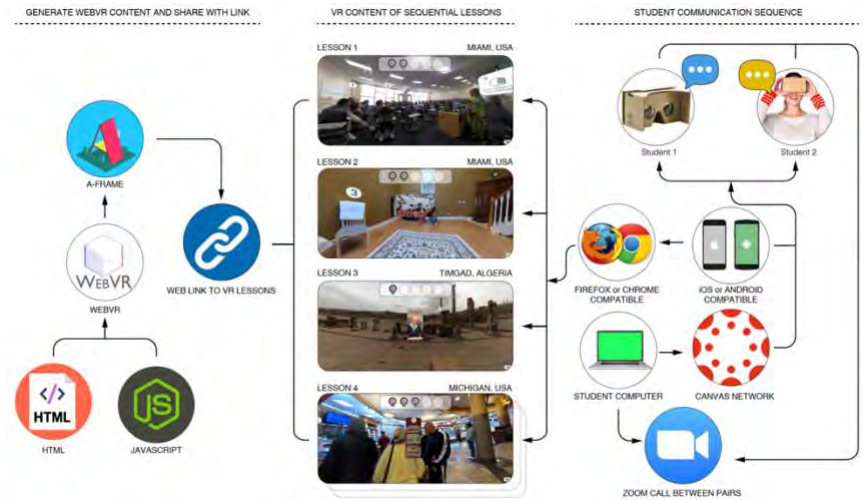

Figure 5: Virtual Tabadul Workflow

Logistical Hurdles

We faced a number of logistical hurdles at the beginning of the program. Sourcing and shipping the Google Cardboards proved quite challenging at the beginning of the pandemic, with deliveries being held up in Customs in our international partners' countries. We have learned that at the proposal stage, all the logistical aspects (sourcing in the U.S. versus overseas, item costs, shipping costs, shipping time, etc.) must be accounted for. If not addressed early on, these logistical issues could cause major delays. In addition, it is always a good idea to have a back-up plan such as alternative places from which supplies can be purchased and even alternative shipping options. For example, for one of our 360 cameras, it ended up being logistically easier for us to have one of our team members physically take it with him while traveling back home to North Africa.

Privacy, Security, and Datafication Issues

A final challenge that we dealt with while setting up the project was privacy, security, and datafication issues, and, critically, aligning these with the U.S. Family Educational Rights and Privacy Act (FERPA). Our solutions thus far have been to use anonymous survey platforms such as Qualtrics to send out surveys required by our sponsor and our research; having students submit their language assessment tasks through a link in Canvas instead of the Canvas course itself; password protected Zoom links generated from the U.S. students' own Zoom accounts; and consent documents that can be signed electronically. All documents are stored in a password protected and secure storage space that is housed at FIU. We are lucky that the U.S. students' universities have Zoom licenses that allow each student to create their own Zoom link and that FIU has a Qualtrics license to

protect cloud storage. For future scale, other programs may need to find different solutions given that university-level licenses for these platforms are expensive.

NEXT STEPS

Now that we have created Virtual Tabadul's VR spaces and task-based curriculum, we are implementing virtual exchange across five semester cohorts. We will continue to ideate and improve our facilitation strategies with each cohort, relying on student outcome data, task-based outcomes, and each team member's voice to ensure the tasks are meeting students' and their communities' needs. As Virtual Tabadul aims to promote second language acquisition and global citizenship, we are eager to evaluate student assessment outcomes and explore how their tasks (e.g., teaching about linguistic landscape in their community; creating a tourism brochure for Algeria; raise awareness about the Muslim community in Miami) foster improved proficiency and, also, serve their community.

Conclusion

The goal of this article has been to share how we created Virtual Tabadul, a virtual exchange program for English and Arabic foreign language and culture learning and community building. Virtual Tabadul uses VR and smartphones to create a pedagogical environment for students from all over the world—beginning with a collaboration between the U.S., Algeria, and Morocco—that aims to strengthen students' global citizenship through international collaboration online. We have described how we created the curriculum for the project, the processes followed to create the technology supporting Virtual Tabadul, our team structure, and then examined our main challenges thus far and how we are overcoming them. We have also detailed how we navigated multi-institutional and cross-cultural contexts to promote sustainable and scalable virtual exchange. Our overall aim is to make Virtual Tabadul accessible to all, motivate more Arabic language study in the U.S., and provide U.S. and MENA region youth with meaningful virtual exchange experiences for language learning and friendship. We hope that this paper serves as an example for others who aim to launch similar programs in serving their own students, and that it fosters further collaboration, research, and innovation in virtual exchange.

Note

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MELISSA BARALT, PhD, is an Associate Professor and applied psycholinguist at Florida International University, with academic placement in Modern

Languages, The Center for Children and Families, Education, and Biomedical Engineering. She specializes in psycholinguistics, second language acquisition, language learning and teaching, and child bilingualism. Her work has been funded by the National Institutes of Health, the National Endowment for the Humanities, and the United States Health Resources and Services Administration, Maternal and Child Health Bureau. Email: mbaralt@fiu.edu

STEPHANIE DOSCHER, Ed.D, is Director of the Office of Collaborative Online International Learning at Florida International University. She is co-author of *Making Global Learning Universal: Promoting Inclusion and Success for All Students* (Stylus & NAFSA, 2018), and contributing editor of *The Guide to COIL Virtual Exchange* (Stylus, 2022). She hosts the Making Global Learning Universal Podcast (https://globallearningpodcast.fiu.edu), is Faculty Fellow with FIU's Center for Leadership, and serves on the editorial advisory board for AAC&U's *Liberal Education.*Email: sdoscher@fiu.edu

LAKHDAR BOUKERROU, PhD, is an Associate Research Professor and Director of International Programs and Global Initiatives in the College of Engineering and Computing at Florida International University. He also holds an Affiliate Faculty appointment in the African and African Diaspora Studies Program at the Steven J. Green School of International and Public Affairs. He specializes in international development, institutional and human capacity building, and program management and evaluation with an emphasis on Africa and the MENA region. Email: lboukerr@fiu.edu

BIAYNA BOGOSIAN, PhD, is Assistant Professor of Architectural Technology, Associate Program Director of the Robotics and Digital Fabrication Lab, and Affiliated Faculty with the Institute of Environment at Florida International University. She is an interdisciplinary researcher focused on the role of data-driven locative and immersive media (AR/VR) in interactive and participatory initiatives that lead to innovation for the built environment. Her research has been supported by the SOM Foundation and National Science Foundation grants. Email: bbogosia@fiu.edu

WESSAM ELMELIGI, PhD, is Assistant Professor and Director of the Comparative Literature Certificate and Director of the Arabic Translation Certificate at the University of Michigan-Dearborn. He is the author of two books, *The Poetry of Arab Women from the Pre-Islamic Age to Andalusia* (2019) and *Cultural Identity in Arabic Novels of Immigration: A Poetics of Return* (2020). He specializes in comparative literature, translation, and theory. Email: elmeligi@umich.edu

YOUCEF HDOUCH, PhD, is Professor and Head of the English Language and Literature Department of the Faculty of Languages and Arts at Ibn Tofail University, Morocco. Dr. Hdouch is the coordinator of the TEFL BA program and the Soft Skills in the Global Workplace vocational program. He has published

numerous books and articles and served as reviewer and evaluator for many national and international journals. He is also the coordinator of several EU ERASMUS Plus programs aimed at the inclusion of students with disabilities in higher education. Email: yhdouch@yahoo.com

JAMIL ISTIFAN, MA, is a Teaching Professor of Arabic and French in the Department of Modern Languages at Florida International University. With over 20 years of teaching experience, he is interested in promoting strategies to teach foreign languages and especially Arabic language learning amongst U.S. youth. Email: istifanj@fiu.edu

ABDELHAK NEMOUCHI, PhD, is professor of Applied Linguistics at the University of Oum El Bouaghi, Algeria. Dr. Nemouchi has served as Head of the Department of Foreign Languages and President of the Scientific Council of the Faculty of Arts and Languages. He contributed to the implementation of the LMD reform in the Algerian university system and in 2009 was promoted as a visiting teacher in Spain and China. Dr. Nemouchi has supervised more than 100 Masters theses and a dozen PhD dissertations. In parallel with teaching and supervising, he is an expert in the reform of higher education with the European Union. Email: abdelhak_nemouchi@yahoo.fr

TARON LIZAGUB KHACHATRAN is the Chief Scientist at Knoxlabs. Taron has an extensive history both in manufacturing VR accessories and VR/AR development. He built the first web VR development platform, Rodin, that enabled frontend developers to build device-agnostic VR/AR apps. He started Knoxlabs in 2014, manufacturing Google Cardboards, which is now the largest virtual reality marketplace. His background is electrical engineering and mathematics and research on brain computer interfaces, particularly language systems in virtual reality. Email: taron@knoxlabs.com

NOHA ELSAKKA is a PhD candidate in the Department of Teaching and Learning at Florida International University. Her research is on task-based approaches to the teaching of Arabic as a foreign language, needs analysis, and curriculum design. She teaches English as a second and a foreign language and Arabic as a foreign language. Email: nelsa005@fiu.edu

FERNANDO ARANA is a Master's student in Architecture at Florida International University. Originally from Guatemala, his interests lie in understanding how buildings affect its surrounding and how to make the built-environment an inclusive experience. Email: faran020@fiu.edu

JONATHAN COBOS-SOLIS is a Master's student in Biomedical Engineering at Florida International University. He works with functional near-infrared spectroscopy in FIU's Biomedical Engineering Creative Lab. Email: jcobo009@fiu.edu

GIANCARLO PEREZ is a Master's student in Computer Science at Florida International University. He works as the Senior Research Assistant at the Robotics and Digital Fabrication Lab. Email: gpere220@fiu.edu

SALAH-EDDINE MOUCHANE is a PhD candidate in the Department of Teaching and Learning at Florida International University. His research interests encompass study abroad, psycholinguistics, and Arabic and English foreign language teaching. Email: smouc001@fiu.edu

SHAHIN VASSIGH, PhD, is Professor of Architecture and Director of the Robotics and Digital Fabrication Lab at Florida International University. She specializes in developing technology-mediated learning environments and educational software for postsecondary education. Email: svassigh@fiu.edu