

Cross-Cultural Collaboration in Educational Development: Co-Creating a Digital Library for Northeast Syria

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Keywords	Abstract
Participatory Action Research, offline digital libraries, digital and information literacy, conflict-affected education, cross-cultural partnerships, multilingual education	This study explored the collaborative development of an offline digital library for use in Northeast Syria, highlighting the challenges and achievements of a cross-cultural partnership between the Autonomous Administration of North and East Syria (AANES) and an educational initiative at Arizona State University (ASU) in the US. Employing Participatory Action Research, the project focused on empowering local communities through technology-enhanced education amidst the region's complex socio-political landscape. This case study detailed adapting educational tools to meet the area's diverse linguistic and cultural needs, enhancing access to educational resources, and building digital and information literacy. The project's success demonstrates such partnerships' potential to positively influence educational practices, even in conflict-affected areas, providing a model for future initiatives aiming to integrate technology in challenging environments.

Introduction

Designing and implementing educational projects with communities that are rural, marginalised, or otherwise considered outside of the mainstream requires flexible approaches that challenge traditional research methods (Traxler & Smith, 2020). In North and East Syria (NES), challenges were compounded by ongoing conflict that has led to mass displacement, infrastructural damage, and widespread disruptions in all aspects of residents' lives. Undertaking partnered educational projects that cross cultures requires acknowledging these issues and working in an empowering way. Such work requires innovative, flexible, and interdisciplinary approaches. Through the lens of Participatory Action Research (PAR), this article explores one such example: a partnership between the Department of Education (DoE) of the Autonomous Administration of North and East Syria (AANES) and a global educational initiative based at Arizona State University (ASU) in the US.

This paper draws on PAR to illustrate the activities and processes undertaken by AANES and the initiative's team members to create and implement a digital library that meets the needs of teachers and students in NES. This reflective analysis defines the project cycles, explores the successes and challenges of this approach, and examines how knowledge generation has occurred at each stage of the action-research process. This case study might inform other practitioners and researchers seeking to tackle challenging, cross-cultural projects to enhance educational opportunities with communities distant and different from the mainstream. It also



highlights how participatory approaches can support equitable and contextually grounded educational interventions.

Contextual Background of North and East Syria

During the Syrian Civil War, the AANES emerged as the governing body of a de facto autonomous region in NES. Its origins trace back to 2012 when Syrian government forces withdrew from Kurdish-majority areas. The governance structure of AANES is characterised by multi-ethnic participation, gender equality, and grassroots democracy. Since its inception, AANES has faced significant military, political, and governance challenges, including fierce battles against the Islamic State of Iraq and Syria (ISIS).

In addition to ongoing ISIS hostilities, the region has also been a target of Turkish military operations that have continuously disrupted regional infrastructure. Despite this adversity, AANES has implemented a unique system of local governance that promotes extensive civil liberties, particularly regarding gender rights and secularism. However, the administration has yet to receive formal recognition from any sovereign state and continues navigating complex relationships with the Syrian government and international actors. Establishing educational infrastructure (including facilities, materials, and reliable electricity) has been financially and logistically challenging. In addition, the DoE must serve linguistically diverse communities (Arabic, Kurdish, and Syriac), where the language of instruction remains politically sensitive.

The SolarSPELL Initiative

SolarSPELL at ASU is a global educational initiative that combines curated digital libraries, solar-powered offline technology, and the necessary training to build information literacy and digital skills. To date, SolarSPELL has collaborated with partner organisations in 15 countries across the Pacific Islands, East and Southern Africa, and the Middle East to curate and distribute nearly 700 digital libraries, reaching an estimated 500,000 people. SolarSPELL's collections include education, health, and agriculture, all being localised to meet varying information needs across countries. Foundational to SolarSPELL's approach is a train-the-trainer model and the belief that forming partnerships to build skill-sets locally is the key to long-term project sustainability (Hosman, 2014).

SolarSPELL's approach is a four-step process: 1) co-curating digital library collections localised for each country; 2) creating solar-powered portable offline libraries; 3) building skills locally via train-the-trainer workshops; and 4) conducting ongoing monitoring, evaluation, and learning (MEL) to drive continuous improvements. Users access the SolarSPELL library entirely offline by connecting any Wi-Fi-capable device to a solar-powered ultra-portable microserver. No internet, electricity, or subscription is required. SolarSPELL libraries contain tens of thousands of multimedia files, and interactive and open-access resources that can also be downloaded to a user's device and taken with them for unlimited use and sharing. All library content is standardised (mp4, mp3, pdf, html) to ensure resources can be opened, downloaded, and shared across any device without any required apps or software downloads.

The SolarSPELL initiative engages approximately 200 university students annually in project-based roles supporting global library development. These roles allow students to meaningfully engage in projects with real-world applications and impact, while simultaneously improving educational opportunities for learners around the world (Paget, 2024).

SolarSPELL offline digital libraries were introduced to the DoE leadership as a means to address the shortage of textbooks, educational tools, instructional media, and libraries in schools in NES. Furthermore, since the SolarSPELL library functions offline, it offers an innovative way to build digital literacy skills within a safe environment to protect students in NES from potentially harmful influences. This project extended SolarSPELL's model into a conflict-affected, multilingual context, raising important questions about how offline digital learning tools can be collaboratively adapted and implemented in low-connectivity environments.

Situating this Study

Research highlights the importance of understanding local educational contexts and reciprocal knowledge exchange in cross-cultural partnerships (Alcorn, 2010; Guo & Huang, 2021). Research on disrupted education systems also underscores the challenges of sustaining learning in crisis contexts. Lack of internet connectivity in resource-constrained primary and secondary school settings presents a significant barrier, making alternative ICT approaches essential (Hillier, 2018).

Local educator involvement is also critical in designing contextually relevant interventions, supporting the use of PAR in such settings (Alcorn, 2010; Heredia et al., 2019). This study addresses these gaps by focusing on the co-creation and implementation of an offline digital library in a conflict-affected, low-connectivity context.

Research Objectives

This study examined the co-creation and implementation of an offline digital library in NES through a cross-cultural partnership. Guided by PAR, the study addressed the following research objectives:

1. To examine how a cross-cultural partnership between AANES and SolarSPELL enabled the co-creation of a localised, multilingual digital library in a conflict-affected, low-connectivity context.
2. To analyse how PAR shaped the processes of collaboration, decision-making, and adaptation throughout the project lifecycle.
3. To assess the perceived educational outcomes of the digital library, particularly in relation to access to information and the development of digital and information literacy among teachers and students.

Methods

Research Methodology

PAR, the framework adopted for this analysis, is a research approach that emphasises the value of experiential knowledge and community leadership to address social inequities, using collaborative processes to generate new knowledge and foster empowerment-driven change (Cornish et al., 2023). PAR is iterative and cyclical, involving processes of defining, acting, observing, and reflecting, with relationship building and knowledge generation evolving. PAR's prioritisation of community goals over purely academic ones makes it an appropriate methodology for action-oriented research that should remain flexible and adaptable to evolving needs (Cornish et al., 2023). PAR is an appropriate lens for viewing collaborative educational projects, providing a robust framework for addressing educational challenges in complex settings.

This research project adopted the core PAR qualities from its inception, enabling active collaboration and contribution between researcher-practitioners and community members. The *participatory* component of this approach ensured that processes and outcomes remained contextually relevant, culturally sensitive, and responsive to evolving needs.

Population and Sample

This case study did not involve a formally defined sample but drew on participants engaged in the project, including DoE staff, SolarSPELL team members, and teachers involved in pilot implementation. For the outcome assessment, survey data were collected from 22 teachers across three pilot schools representing the primary linguistic groups in the region.

Tools and Techniques

Data for this case study were primarily collected through bi-weekly meeting notes spanning two and a half years (from January 2022 through June 2024), project plans, and project documentation. These sources documented ongoing interactions, decision-making processes, and adaptations over time. Additional tools included surveys and interviews conducted with teachers during the pilot implementation phase, which informed the evaluation of educational outcomes.

Procedure

The study followed an iterative PAR process involving collaborative planning, implementation, observation, and reflection. Project activities were jointly defined and adapted through ongoing engagement between AANES and SolarSPELL team members. Data were generated through continuous documentation of project activities, including meetings, training sessions, and implementation phases. These data were reviewed and interpreted to identify key processes, challenges, and outcomes associated with the project.

PAR has been widely applied in conflict-affected contexts, including the Solomon Islands (Alcorn, 2010), Haiti (Neufeldt & Janzen, 2021), Northern Ireland (Lundy & McGovern, 2006), and across Sub-Saharan Africa (Worthen et al., 2019), underscoring its relevance for this study. Engaging with conflict-affected and/or marginalised communities requires careful consideration of several ethical aspects:

- Maintaining sensitivity to the socio-political and economic challenges.
- Prioritising informed consent and inclusive participation.
- Committing to community empowerment and capacity building.

Results: The Case Study

Co-creation of a Localised Digital Library (RO1)

In designing and carrying out this project, team members from the SolarSPELL initiative and AANES applied PAR principles, namely all project activities were jointly decided upon and action was prioritised over research. The participatory approach enabled adaptation of the digital libraries to local needs and strengthened ownership of the resources.

The SolarSPELL initiative relied on AANES team members' expertise as educators and members of the community to curate a culturally and linguistically relevant library. The AANES team led on-the-ground implementation, while the SolarSPELL team provided technical expertise on hardware, software, metadata tagging, training, and monitoring and evaluation.

The collaboration launched in August 2021 with the ultimate goal of introducing offline digital libraries to schools in the region. Initial project phases focused on project planning and partnership development through biweekly virtual meetings. In October 2021, this partnership

received endorsement from AANES co-President Ilham Ahmed during a meeting in Washington DC, enabling the DoE to formally engage with the SolarSPELL initiative.

Upon official project approval, the biweekly virtual meetings shifted to discussing roles and responsibilities, and content priorities for the digital library. From the ASU side, two native Arabic-speaking graduate students began identifying existing Arabic language open-access educational content initiatives. Once their research project concluded, the documentation was shared with the DoE team to prioritise content for library inclusion. Subsequently, additional native Arabic-speaking students were recruited to assist with metadata tagging of this content so that it could be organised, categorised, and added to the library. Metadata tagging organises and tags each library resource (tags include author, title, subject, keywords, audience, resource type, year of publication, copyright, etc.) to enable search and retrieval within the library.

This partnership led to the creation of SolarSPELL's first non-English-language library collection and was the first to feature right-to-left scripts, presenting multiple software challenges. It also highlighted the importance of recruiting Arabic-speaking students from across the university (and beyond) to assist with all aspects of the project. Since 2021, students (both online and in-person) from Saudi Arabia, Jordan, Yemen, United Arab Emirates, Egypt, Palestine, Lebanon, Malaysia, Turkey, and Northwest Syria contributed to this project. These students supported many project activities, including content identification, content curation and metadata tagging, translation, interpretation, monitoring and evaluation, graphic design, user testing, and interactive course creation.

Each SolarSPELL library collection's homepage banner was localised for where it would be used. In this case, DoE highlighted local landmarks that were culturally and historically relevant. The design was developed iteratively between DoE employees and SolarSPELL student-interns and staff. Each of the library's icons is listed in all three official languages of NES, to promote inclusivity.

During this time (2021-2022), the SolarSPELL team also began developing a user-friendly website for AANES partners to use to contribute to content curation. This ultimately enabled the AANES team to identify and curate content in Kurdish and Syriac. Once Version 1 of this website was created, training was conducted for the DoE team to use the website, and to give suggestions for continual website improvement, one example of which was to provide standardised keywords from a drop-down menu, to enhance efficiency and accuracy. The SolarSPELL team eventually adopted this approach for all of its collections.

Participatory Process and Collaboration (RO2)

One significant project challenge was that the SolarSPELL team could not travel to Syria due to travel restrictions, and travel visas for the AANES team took one year to process. Despite this delay, collaboration continued virtually, requiring flexibility and adaptation.

In April 2023, key DoE personnel traveled to ASU for a comprehensive five-day train-the-trainer workshop provided by the SolarSPELL team. The training workshop marked a critical phase, focused on equipping the participants with the necessary skills and knowledge to utilise and teach using the SolarSPELL libraries effectively. This also presented a unique opportunity for face-to-face collaboration, fostering the relationship building critical to cross-cultural collaboration (Toprak & Genc-Kumtepe, 2014). The teams spent significant time interacting during meals and social activities to foster relationship building. All communication between the teams required real-time interpretation, making multilingual interpreters essential contributors who mediated meaning, built trust, and enabled effective collaboration across linguistic and cultural boundaries.

This relationship building immediately bore fruit, as the AANES team revealed during the latter half of the training that they had developed nearly 1,000 instructional videos during the Covid pandemic, which they had not previously shared, believing these videos to be of low quality. Had they previously shared these videos, it could have significantly improved the amount of localised content in the library collection they took back to NES. In other words, we needed to build a deeper level of trust, which finally happened when we spent time together in person.

The workshop also supported joint planning for pilot implementation and evaluation, including in-depth elaboration of teacher-training workshops and the iterative co-development of all survey and interview tools. By July 2023, AANES leaders identified three pilot schools representative of the region's three primary languages, and conducted multi-day workshops for 60 teachers in preparation for the September 2023 launch.

Educational Outcomes and Impact (RO3)

The pilot programme's introduction at the beginning of the 2023-2024 school year marked a new chapter for the project, with its early stages showing promising feedback from students and teachers. This initial success encouraged the DoE to plan a broader roll-out, aiming to expand the project and bring more SolarSPELL libraries to additional schools across the region.

In the second semester of library use at the three pilot schools, 22 teachers, from all three schools, completed in-person surveys intended to assess the impact the digital libraries were having in terms of access to information, building digital and information literacy skills, and overall effectiveness in meeting their informational and pedagogical needs. Notably, 95% of teachers surveyed agreed or strongly agreed that their students were better able to carry out research or find new information after using the SolarSPELL library, with the remaining 5% of respondents answering "neutral." Similarly, 96% of teachers agreed or strongly agreed that the library was useful for supporting their students' education. Seventy-eight percent of teachers reported feeling more professionally motivated to do their jobs as a result of using the SolarSPELL library, and 68% felt better prepared for their work as teachers from using the library.

These findings suggest that the offline digital library contributed to both improved access to information and the development of digital and information literacy in low-connectivity classroom settings. After conducting this impact evaluation, analysing the results, and writing up the findings, the two teams collaboratively planned expansion and co-authored funding proposals. At the time of writing, the funding had been secured to expand the project to eight additional schools.

Discussion and Implications

PAR Cycle Lens

This section interprets the case study through the PAR framework lens, an iterative and cyclical process of defining, acting, observing, and reflecting. These stages do not exist independently of one another; they may not require the entire cycle to play out, and there may be miniature cycles within each. This flexibility makes PAR well suited to complex, evolving contexts and supports ongoing relationship building and knowledge generation.

The entire project described in the case study has been a macro-level manifestation of the PAR cycle. We collaboratively defined the central problem as a lack of educational resources for teachers and students in NES. Next, we co-defined a plan of action to create an offline digital library localised for secondary schools in NES. Our first point of collaborative action was to

begin co-creation of the digital library, with the NES team identifying the content they would like to see in the library and the SolarSPELL team finding and curating that content.

Although the teams did not meet to redefine their roles within the curation process, in fact, through observing, learning, and reflecting, the library co-creation process evolved such that the DoE team became increasingly involved with creating, finding, and metadata tagging content. This demonstrates the non-linear and flexible nature required of cross-cultural endeavours and embodies the knowledge generation throughout the partnered project timeline. Since library curation is one aspect of the overarching project, this also demonstrates the micro-level cycles that spontaneously exist within a complex project that PAR accommodates. Multiple other micro-cycles transpired within the case study, including iterative relationship building; content curation, website development, use, and improvement; and monitoring and evaluation, tool development and implementation.

Returning to a macro-level view reveals how the action phase entailed the train-the-trainer workshop, the teacher training, and the implementation of the libraries in the pilot schools. The observation phase entailed the implementation of the monitoring and evaluation tools by the DoE team. This illuminated the overwhelmingly positive reception of the initiative's digital libraries at the pilot schools and informed the plans for the next phase of the project. The end of the pilot school year provided an opportunity for reflection on the project. The present paper represents a tool of this reflection process, with the successes and challenges described below as one result of this reflection.

Challenges and Successes

As with any cross-cultural educational project, we faced many challenges, both foreseeable and unpredictable. A common challenge to any real-world project is personnel turnover, and this project was no exception. However, new people were identified in these cases and rose to the challenge. Another way we minimised the impact of turnover was by having multiple people involved in the various project activities, thus retaining institutional knowledge amidst individual attrition. Another common challenge arose from time zone differences and unreliable internet connectivity. The two teams were nine hours apart, but we used this to our advantage in that the NES partners had more reliable internet from their homes, and were thus able to make calls in the evenings. When internet outages occurred, we remained flexible and rescheduled meetings as needed.

Language is a commonly acknowledged challenge in cross-cultural educational endeavours, with every meeting and communication requiring an interpreter or translator, which at least doubles the amount of time and increases the cost of a project. Taking this on as the first non-English library collection opened the SolarSPELL team's eyes to many of the challenges we might face in the future with other non-English collections, strengthening our ability to reach new populations now and in the future. Beyond logistical challenges, translation played a central role in mediating meaning and sustaining trust, underscoring the importance of skilled multilingual contributors in participatory, cross-cultural projects.

Political and logistical challenges shaped the collaboration, including a one-year delay in visa approvals and ongoing disruptions due to conflict. Despite these constraints, both teams sustained engagement, and trust was built over time—particularly through in-person interaction, which proved critical to navigating the partnership.

Having the time and opportunity to build this trust was one of many factors contributing to the project's success. Most salient among the events during the partnership was the in-person

training held on ASU's campus in April 2023, when the teams could spend an entire week together, both working and socialising. As Toprak & Genc-Kumtepe (2014) emphasise, in-person relationship building is an essential success factor in cross-cultural projects. Outside of the in-person workshop, the teams maintained frequent communication, mostly via bi-weekly video conferencing. Frequent communication was important to maintain a mutual understanding of project goals and activities (Alcorn, 2010) and facilitated both teams' commitment to continuous improvement across all aspects of the project.

The following success factors were unique to this project and could be challenging to replicate. In the SolarSPELL team's nine years of experience working across 15 countries, no other Ministry of Education has been willing and/or able to commit such a significant amount of their staff's time to co-creating and supporting the implementation of the SolarSPELL library. We believe that one reason for this commitment was the support for the project from the highest levels of the AANES government. Another success factor difficult to replicate is the quality and commitment of the individuals working on this project.

Overcoming these challenges and realising successes has culminated in a co-created localised digital library currently being used in nine NES schools, including expansion to six additional schools beyond the initial three pilot sites. Preliminary impact evaluation indicates that the library is increasing digital and information literacy skills and that teachers and students alike greatly enjoy using it.

Implications for Open and Distance Learning

This study's findings have broader implications for open and distance learning (ODL), particularly in low-connectivity and conflict-affected contexts. While ODL is often associated with internet-based delivery, this case demonstrates the continued relevance of offline and hybrid approaches for expanding access to learning. This challenges dominant assumptions that effective ODL must be digitally networked, demonstrating that offline-first approaches are viable and scalable alternatives, supporting findings that emphasise the role of offline and locally grounded approaches in expanding access to learning in under-connected contexts (Farrell et al., 2024; Hillier, 2018). The use of locally curated, multilingual digital libraries highlights the importance of contextualisation in ODL design, especially in linguistically and culturally diverse settings (Alcorn, 2010; Heredia et al., 2019).

Furthermore, the participatory processes underpinning this project suggest that effective ODL implementation requires not only technological solutions but also sustained collaboration, trust building, and local ownership (Cornish et al., 2023). These insights are applicable to other regions facing infrastructural limitations or instability, where flexible, community-driven approaches may be more effective than standardised, connectivity-dependent models of distance education (Phiri & Chizengo-Thawani, 2025).

Conclusion and Future Research

This study demonstrates how participatory, cross-cultural partnerships can support the co-creation and implementation of offline digital learning tools in conflict-affected, low-connectivity contexts. By integrating local knowledge with technological approaches, the project highlights the importance of flexibility, trust building, and sustained collaboration in achieving contextually relevant educational outcomes.

Future research should examine the long-term educational and social impacts of such approaches, as well as their applicability in other under-connected or crisis-affected regions. In

doing so, this work contributes to ongoing discussions in ODL, particularly regarding the role of offline and community-driven models in expanding equitable access to education.

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