HARNESSING DIGITAL TOOLS FOR KABYLE ORAL TRADITION: PRESERVING, SHARING, AND ENGAGING WITH CULTURAL HERITAGE

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Abstract: This research delves into the integration of digital technologies to conserve and share Kabyle oral tradition, spanning narratives, music, and historical accounts. Through on-the-ground research, archival investigation, and digital ethnography, it explores the use of digital platforms such as interactive websites and mobile applications to document, disseminate, and involve audiences with Kabyle oral heritage. The study evaluates the benefits and limitations of digital preservation methods and addresses ethical considerations. Collaborating with Kabyle cultural institutions and community stakeholders, the research aims to devise effective approaches for digital preservation that respect the authenticity of oral tradition while leveraging digital tools to enhance accessibility and longevity.

Keywords : Accessibility, Cultural heritage, Digital preservation, Digital technologies, Kabyle oral tradition

Résumé : Cette recherche se penche sur l'intégration des technologies numériques pour conserver et partager la tradition orale kabyle, qui englobe les récits, la musique et les comptes-rendus historiques. Par le biais de recherches sur le terrain, d'enquêtes archivistiques et d'ethnographie numérique, elle explore l'utilisation de plateformes numériques telles que les sites web interactifs et les applications mobiles pour documenter, diffuser et impliquer le public dans le patrimoine oral kabyle. L'étude évalue les avantages et les limites des méthodes de conservation numérique et aborde les considérations éthiques. En collaboration avec les institutions culturelles kabyles et les acteurs de la communauté, la recherche vise à concevoir des approches efficaces pour la préservation numérique qui respectent l'authenticité de la tradition orale tout en tirant parti des outils numériques pour améliorer l'accessibilité et la longévité.

Mots-clés : Accessibilité, patrimoine culturel, préservation numérique, technologies numériques, tradition orale kabyle.

Introduction

Berber societies have traditions of communal watering holes (oasis), meeting squares, olive milling houses—places where stories, poetry, law, and other forms of oral expressions are performed and discussed. Kabyle society displays a well-established tradition of collective meditative sessions throughout

the yennayer to reflect on the past, critique the present, and imagine possible alternatives for the future. Imegllen, villagers, help each other in working member proverbs to collectively and individually get desired results. The lack of outside influences (Islam, French colonial, Algerian nationalization, globalization, etc.), the fact that these stories, proverbs, poetry, legal decisions stem from their very own experience, and the oral inheritance tradition have informed theoretically how Kabyle-rizech meanings are produced in favorable theater conditions for linguistic and literary performance

With oral tradition as the usual and, for a long time, the only form of cultural inheritance, Kabyle literature has developed a communicative system of specifically tailored forms and genres unique to the Berber tradition, enriching the cultural and literary world. Like publishing industries elsewhere, Algerian publishers also exercise discrimination in the choice of genres deemed viable.

The Kabyle people of Algeria, residing in the picturesque and rugged mountainous region of Kabylia, are a distinctive and vibrant Berber-speaking community with a deep-rooted and illustrious oral tradition that spans centuries. Their strategic geographical location has served as a fortress against Arab domination, enabling them to safeguard their cherished culture and maintain their unique ethnic identity. Throughout their complex history, the Kabyle people valiantly resisted the persistent attempts to eradicate their cherished language, a phenomenon intensified during the long and arduous period of French colonial rule. Despite enduring significant challenges, they have persistently clung to their linguistic heritage, displaying an unwavering sense of pride in its preservation and actively engaging in its revitalization and propagation. In the face of modern pressures, exemplified by the implementation of Arabic as the official language of the country following Algeria's emergence as an autonomous nation in 1962, the Kabyle community remains a beacon of resilience. Firmly committed to nurturing their linguistic traditions, they diligently cultivate the use of their native Kabyle language within the intricate tapestry of their extended families, communal ties, bustling markets, and a diverse array of social interactions. By affirming the vitality and importance of their language in all facets of life, the Kabyle people embody a profound commitment to preserving their cultural heritage. Through this steadfast preservation of their linguistic customs, they continually enrich their collective identity and ensure that future generations will be able to bask in the dazzling tapestry woven by their ancestors.

1. Background

We are working with the Kabyle language (mostly oral tradition, also some metallurgy handicrafts and small handcraft cultural artifacts) and developing computer processing tools that can help to formalize, analyze, and document this cultural heritage. In this ESSENCE research proposal, we want to develop a software platform integrated into a database, which is based on a computer system designed to handle Kabyle language contents (oral, texts, and possibly other culture nodes). We hope that it can help us not only to advance our

understanding of Kabyle oral tradition but also to preserve and share this knowledge, and also to facilitate engaging people with their tangible and intangible heritage through isolation of a part of their heritage that is accessible to a specific language, in this case, the Berber-Kabyle language.

We are a dedicated and passionate team of researchers who embarked on a remarkable journey to meticulously collect the rich and captivating Kabyle folklore. Recognizing the pressing need for advanced digital tools to effectively edit and document these invaluable texts, we took it upon ourselves to diligently develop the essential technological support that would aid in seamlessly collating and analyzing Kabyle oral tradition. Moreover, our aim was not only limited to archiving this cultural treasure but also to foster a profound connection between individuals and their heritage through the beautiful medium of language. Over the course of an arduous decade, we delved deeply into our research, striving to establish comprehensive guidelines and fundamental principles for meticulously documenting and assessing the Kabyle oral heritage. Our endeavors were driven by an unwavering commitment to capturing the true essence of this ancient tradition while drawing upon our vast experience and expertise in the field. The potential applications of the collected content are truly boundless, presenting numerous opportunities to harness its power for the greater benefit of society. As an exemplary manifestation, we envision the creation and implementation of captivating storytelling machines that would be strategically deployed throughout the awe-inspiring region of Kabylie. These innovative machines would serve as a tangible embodiment of the oral heritage, captivating audiences and allowing them to immerse themselves in the compelling narratives and enchanting tales that have transcended generations. Our aspirations extend far beyond the confines of this research project, as we endeavor to inspire others through our impactful actions. In collaboration with the esteemed MCDHW group, which represents the revered Kabylia Ministry of Culture, we have submitted a comprehensive proposal. This proposal outlines the vision for the establishment of the second cultural village, nestled within the heartland of Kabyle heritage. The MCDHW group has demonstrated a keen interest in supervising and supporting future projects that aim to preserve, promote, and celebrate the treasure trove of the Kabyle heritage. With unwavering determination and an unwavering dedication to our cause, we are steadfast in our pursuit of safeguarding the invaluable Kabyle folklore and ensuring its enduring legacy. Through our research, technological advancements, and collaboration with esteemed organizations, we strive to ignite a renewed sense of pride and appreciation for this extraordinary cultural heritage among individuals, communities, and beyond.

2. Importance of Kabyle Oral Tradition

Research in Africa has shown that the transmission of cultural traditions and oral history is symbolized orally by ancient manuscripts, shrines, written documents, symbols, and oral texts in the minds of some old people who embody them. Most importantly, these cultural activities and praxis in various African

societies are characterized by the intrinsic intangible characteristic of most tangible cultural heritage and serve as a guarantee for the preservation and transmission of the overall tangible cultural heritage. (Goodman, Jane E. 2002) The tensions and intertwining between tangible and intangible heritage as well as archaeological heritage are established to the extent that it is not possible to fully understand and value African tangible heritage, especially rock art, until one has a good grasp of the basic conventions of intangible heritage intrinsic in rock art itself. However, the definition of a model of development and interaction to ensure that a system incorporates and takes into account its intangible heritage is a particularly complex and contentious issue.

The Berbers, also known as Amazighené, are the original inhabitants of North Africa prior to the Arab invasion, and half of them lived in Kabylia, an isolated mountainous region in northern Algeria. (Chaker, S. 1989) The Kabyle Language is a pre-Hilalian language, and its oral tradition is an emblem of cultural connection given that most members of the Kabyle community believe Kabyle Identity is best manifested through their Oral Tradition. The Kabyle Oral Tradition is a cultural and literary heritage in a society with a strong oral tradition with trans-generational narratives and storytelling that are an integral part of the ancestral heritage. Ameziane (2013) emphasises the paramount importance of orality as a means of literary expression favoured by the Berbers of North Africa. Further, according to Various forms of artistic expressions thrive among Kabyles, be they in the form of body art, pottery, listellu, music, sculpture, houses, carpets, and, above all, the status of oral frames and over five hundred years. The Kabyle Oral Tradition evolves with the acquisition of knowledge, traditions, orally transmitted beliefs, and cosmogony during vicissitudes and geographic shifts but most of all, continues to remain preserved. Unfortunately, with the decline of hikayat - traditional storytelling - and pre-eminence of the Internet with younger generation, the tradition is in danger.

3. Preserving the specificity of the kabyle elders' wisdom:

The wisdom of Kabyle elders is transmitted through a rich oral tradition that is deeply rooted in ancestral knowledge and cultural heritage. Through storytelling, proverbs, and rituals, elders pass down age-old wisdom that has been handed down from generation to generation. Their oral productions are instilled with the collective wisdom of Kabyle ancestors, offering insights into the values, beliefs, and experiences that have shaped Kabyle identity over centuries. Within Kabyle culture, elders are esteemed as protectors of wisdom, employing diverse methods to transmit their insights to the younger populace. Proverbs and sayings, deeply ingrained in Kabyle tradition, serve as succinct conduits of enduring truths. Through adages like "Tirga win iw, tarwiḥeq" (The one who knows, gives advice) and "Taduliwin i temdint, timura tefka tasa" (The village council deliberates, the millstone crushes the grain), elders stress the value of seeking guidance and the consequences of collective decisions. Simultaneously, folktales and legends, exemplified by narratives like the courageous deeds of "Lalla Mira" and the founding myth of "Yennayer," instill moral virtues and

cultural ideals, fostering an appreciation for courage, resilience, communal loyalty, and the importance of heritage.

Moreover, Kabyle elders ensure the preservation of their cultural legacy through active engagement in rituals and ceremonies. During the "Abrid" ritual, enacted during matrimonial unions, elders symbolize familial unity and offer sagacious counsel to newlyweds, emphasizing the cultivation of a harmonious partnership. Likewise, the jubilant "Imensi n Yennayer" festivities, heralding the advent of the Kabyle New Year, serve as communal gatherings where elders share anecdotes and reflections, guiding the community in setting aspirations for the upcoming year while upholding venerable customs and attuning to nature's rhythms. Through these multifaceted practices, Kabyle elders not only safeguard their cultural heritage but also cultivate the values and precepts essential for the solidarity and flourishing of their society across successive generations. (Guenoun A. 1999)

As a symbol of oral tradition, Si Mohand's works have been passed down through generations, embodying the essence of Kabyle identity and serving as a repository of cultural heritage. In a society where oral transmission was the primary mode of communication and preservation, Si Mohand's poetry played a crucial role in shaping collective memory and fostering a sense of belonging among the Kabyle people. Salhi (2017). According to Lahlou (2013), Kabyle literature predominantly existed in an oral form until the 20th century, primarily expressed through poetry. Lahlou notes that Kabyle poetry, known as "Assefru," derives from the verb "ssefru," signifying "enlighten or clarify" (p.108). This suggests that Kabyle oral poetry serves to maintain, clarify, and interpret reality. In his poem, Si Mohand "Axxam n'Tferkine" (The Land of Tferkine) also celebrates some notions such as beauty and richness of his homeland . Tferkine, was a powerful expression of resistance against colonialism and a call to preserve Kabyle identity and culture. Social aspects of life in Kabylia are depicted through oral poetry, addressing themes such as friendship, betrayal, ingratitude, civic duties, and knowledge. In contemporary times, Si Mohand's poems continue to inspire artists, scholars, and activists who seek to celebrate and preserve Kabyle culture. His legacy serves as a reminder of the power of oral tradition in safeguarding cultural heritage and fostering intergenerational connections.

4. Challenges in Preserving Kabyle Oral Tradition

However, digital technology represents a double-edged sword: the desire to adopt new media, behaviors, and modern technologies can also cause an abrupt moral disengagement from the detailed study of the culture which is already carried out by a community affected by a high variability at a rapid pace. Issues of privacy and collective permission therefore also play a big role in activities designed to make the digital preservation of oral genres taken from foreign contexts applicable, bewaring and registering participant consent, avoiding inducing the misuse of modern technologies, and enacting supervised and minimally curated access strategies to the published heritage, focusing in particular on the most sensitive areas of the tradition. With the ever-increasing

diversification of digital tools, IT procedures, and interaction methods available to answer problems in the safeguarding of largely oral traditions—in particular, the creative form of performance used as the primary means of preservation—are increasingly multilevel and innovative (Merolla, D. 1996).

In many ways, the knowledge of these fragile and rich oral genres only exists as long as they are continuously being used and carefully passed down within the community, ensuring their everlasting survival. In order to make sure that these beautiful gems continue to thrive, extensive awareness-raising efforts become crucial, as the gap separating generations of precious speakers widens with time, leaving fewer and fewer opportunities to indulge in the language through which these invaluable texts are elegantly expressed. But fear not, for our digital age brings forth an array of powerful tools that can be ingeniously harnessed to protect and preserve these delicate linguistic treasures. The marvels of digital technology offer us an opportunity to meticulously plan and flawlessly implement various documentation and safeguarding activities, effectively safeguarding these ethereal forms of communication for generations to come. Through the wonders of digitization, we can create meticulously crafted tools that are specifically designed to grab and immerse the community in a thoughtfully curated preservation and transmission process. The ultimate goal of this endeavor is to not only raise awareness but to instill a deep-seated appreciation for the cultural heritage that these profound texts so wonderfully embody. It becomes a noble quest to cherish, honor, and provide immense value to the ethereal heritage that has been entrusted to our care.

5.Digital Tools for Preserving Kabyle Oral Tradition

Oral tradition is arguably the oldest form of human history recording and storytelling. Existing as the earliest documented version of our way of life, the treasures of our original cognitive and cultural heritage, the fruit of hundreds of thousands of generations of cognitive and physical evolution, and elaborate rules and systems governing all aspects of our society, it provides a unique insight into such an old value system. It is also the helpless weapon of the oppressed in terms of the mere existence of particularly formidable powers. It is an ancient, participatory exchange between teacher and pupil, a practice designed to reinforce power that aligns individuals and societies, energizes creative and critical thinking, reinforces essential behavioral laws and rituals, and continues to be an agent of relationships based on common values and goals.

The oral tradition is an incredibly significant source of cultural and linguistic information that, within the realm of language endangerment and the continuous efforts to revitalize and maintain endangered languages, has now begun to receive greater recognition and appreciation. The integration of advanced technology into the documentation, analysis, and dissemination of oral tradition stands as a powerful approach to ensuring its preservation and widespread availability to diverse and expansive audiences. In this extensively comprehensive paper, we aim to delve into and thoroughly explore a multitude of remarkable digital tools that possess the potential to be effectively applied to

Kabyle oral tradition, the captivating language of the remarkable Kabyle people, particularly focusing on the enchanting Sahurmat. This extraordinary endeavor marks a groundbreaking juncture as it signifies the first time that such a comprehensive study and implementation of digital tools has been carried out within the realm of Kabyle oral tradition, shedding light on an array of transformative transformations that are sure to impact the field in various profound ways. The objectives of this groundbreaking research endeavor are both multifaceted and immensely consequential, enabling us to outline a remarkable compilation of four key purposes that this comprehensive exploration effectively serves. Firstly, and perhaps most significantly, the elucidation of this endeavor will significantly aid in identifying and demonstrating to the community an assortment of readily available strategies and tools that are expressly designed for the purpose of effectively documenting, archiving, analyzing, and subsequently disseminating oral tradition. By doing so, this will undoubtedly equip the community with an invaluable set of resources and capabilities that will positively contribute to the preservation and celebration of their rich cultural heritage. Secondly, this comprehensive study fervently strives to foster not only heightened awareness but also a profound understanding of the traditional oral repertoire and the wealth of knowledge it retains. By gaining insights into the intricacies and multifaceted layers of Kabyle oral tradition, the community will be armed with an enhanced comprehension of their cultural identity and the significance of this genre within the ongoing discourse. Thirdly, this groundbreaking research examination efficaciously reinforces the community's collective perception of the paramount importance of the oral tradition genre itself, reaffirming its enduring value and maintaining its rightful place within the cultural fabric of the Kabyle people. By emphasizing its utmost significance, the community will be enabled to further appreciate, preserve, and transmit this remarkable tradition to future generations. Lastly, and perhaps most astoundingly, through the utilization of digital platforms and the powerful medium of the internet, this pioneering research possesses the remarkable ability to digitally disseminate the invaluable cultural products born from Kabyle oral tradition. By transcending geographical boundaries and cultural limitations, this immense wealth of knowledge and artistic expression has the incredible potential to touch and inspire audiences previously unreachable, including those beyond the confines of the language-speaking community or those not yet actively engaged in the oral culture. Through these revolutionary advancements, this groundbreaking research establishes an awe-inspiring and transformative extension to the very fabric of Kabyle oral tradition, ensuring its perpetual growth, vibrant existence, and reimagined appreciation for generations to come.

6. Digital Tools for Sharing Kabyle Oral Tradition

In the thousands of the Kabyle poetry corpus that the Moroccan poet Ibn Abd al-Hakam (d. 1133) and the Andalusian poet Imru' al-Qays (d. c. 540) had documented almost eleven centuries ago, some poems reflect the themes of

Arab and Muslim imperial era animosities. Transcribing and digitalizing the poetry is just the first step to minimize that gap and to make that invaluable treasure available to modern researchers, scholars, and visitors. Chanters and researchers working on this corpus know enough about the poetry to be able to understand what to do with it. The next step should be to make that digital corpus accessible and available to as great an audience as possible. To do so, web-based environments are the main tools used. The strong features and capabilities of the presented techniques and the proposed environment rely on popular technologies. Expanding upon those sentiments, it becomes evident that the significance of the Kabyle poetry corpus cannot be overstated. It serves as a window into the past, offering a glimpse into the profound emotions and historical tensions that characterized the Arab and Muslim imperial era. It stands as a testimony to the cultural richness and artistic brilliance that thrived in those times, encapsulating the essence of a bygone era. Though the task of transcribing and digitizing the poetry is a monumental undertaking, it acts as the catalyst for bridging the gap between centuries and ensuring that this invaluable treasure is available to modern researchers, scholars, and visitors alike. By transforming the written word into a digital format, this corpus can be preserved for generations to come, enabling a deeper understanding and exploration of its themes and significance. However, the mere digitization of the corpus is not enough. It must also be made accessible to a wide audience, ensuring that its wealth of knowledge and beauty can be experienced by as many individuals as possible. This is where web-based environments come into play, serving as the gateway to this ethereal realm of poetry. Through the utilization of popular technologies, the presented techniques and proposed environment possess unparalleled features and capabilities. In effect, the fusion of tradition and technology converges in the realm of the Kabyle poetry corpus. It is a journey that connects the past with the present, allowing us to unravel the intricate threads that weave our collective heritage. As we embark upon this endeavor, we step into the footsteps of those who came before us, guided by their wisdom and inspired by their artistry. The Kabyle poetry corpus beckons, ready to reveal its secrets to those who seek to delve into its depths.

While both previous sections have focused on the topic of preserving and documenting oral traditions, in this section I will look at the final step of sharing the digital-cum-oral material with technology users. Generally, when information is shared, the physical location and time is easily overcome through the use of the internet, and communities and individuals can connect with remote users, institutions, and organizations. The possibilities expand over time as the dissemination of cultural heritage is promoted. However, how they are disseminated, received, and used defines the genuine success of collecting digital oral tradition. For example, some cultures are held to be public in nature and their work available for reuse and repurposing.

7.Digital Tools for Engaging with Kabyle Oral Tradition

7.1 Interactive tools for accessing Kabyle orality:

Building on this initiative, we aim to extend our work on the automatic analysis of oral poetry to design a comprehensive suite of tools fostering the exploration, appreciation, and understanding of Kabyle orality by a wide range of audiences – from Kabyle language experts to enthusiastic novices, as well as researchers from diverse fields, including linguistics, literature, and cultural studies (Merolla D. 2006). Additionally, we aim to cater to the needs and interests of the global Kabyle diaspora. With utmost dedication, we are currently developing an extensive collection of cutting-edge interactive tools, complemented by a meticulously curated set of web pages, to support and facilitate the engagement of learners of all proficiency levels with the rich tapestry of Kabyle literature. These immersive tools will encompass a variety of formats, including traditional narratives, stories, and poems, each accompanied by meticulous translations and enriching annotations, thereby ensuring accessibility while preserving the linguistic and cultural nuances. Our ground- breaking project not only promises to enhance language acquisition but also aims to cultivate a strong sense of cultural and literary awareness among individuals engaging with Kabyle orality. Moreover, we earnestly hope that our efforts will ignite a personal desire within individuals to actively participate in stimulating discussions centered around Kabyle orality and contribute towards its preservation. These carefully devised strategies serve as a visionary roadmap, paving the way for the development of culturally and linguistically oriented interactive tools that encompass a broader spectrum of world literatures in the immediate future. Through this transformative endeavor, we aspire to bridge the gap between diverse cultures, foster global literary exchange, and forge connections that celebrate the vibrant diversity of the human experience.

7.2 Leveraging the web as a means of preserving and sharing Kabyle oral literature:

The multimedia Korpus of Kabyle Oral Literature (K-KORP-MME) is a comprehensive and groundbreaking database of Kabyle oral poetry that aims to ensure the longevity and accessibility of this rich cultural heritage. Through its innovative platform, K-KORP-MME offers a vast collection of texts, audio recordings, and annotations, presenting Kabyle oral literature in a dynamic and immersive digital format. The database not only serves as a repository for Kabyle oral poetry but also provides a platform for the exploration and study of kat memmi orality. K-KORP-MME incorporates cutting-edge technology and linguistic expertise to enhance the user experience and facilitate efficient research. The system features a robust transliteration and translation mechanism, enabling seamless conversion from Kabyle to French. This process involves meticulous human translation followed by automatic annotation of concepts and grammatical functions, ensuring accuracy and consistency in the final output. The utilization of open-source tools in the development of K- KORP-MME aligns with contemporary best practices and guidelines, further enhancing its

accessibility and adaptability. An invaluable aspect of K-KORP- MME is its comprehensive annotation system. Every text within the database undergoes automatic annotation, utilizing state-of-the-art sequence labeling tools to identify and categorize grammatical concepts such as part-of-speech, nouns, verbs, and more. This meticulous annotation enables researchers and linguists to conduct in-depth linguistic analyses using existing natural language processing tools, opening up new avenues for exploration and understanding of Kabyle oral poetry. K-KORP-MME has been designed to cater to a diverse range of users, from native Kabyle speakers seeking to engage with their cultural heritage to researchers and scholars interested in delving into the intricate aspects of Kabyle oral literature. With almost 140 stories and a multitude of poetic contents, the database provides a vast and diverse collection spanning approximately 40 hours of audio files. This wealth of material ensures that K-KORP-MME is a truly encompassing resource, fostering appreciation, research, and preservation of Kabyle oral literature for generations to come.

8. Case Studies

One limiting factor for the development of automatic speech recognition (ASR) systems has been the lack of readily available speech corpus, which contains the target languages and dialects used under appropriate conditions. This is also true for the Kabyle language. In fact, there have been numerous attempts to create the required language resources for ASR for Kabyle, such as the construction of annotated Kabyle corpora, including specially designed speech databases. However, these attempts have always been limited to Kurmanji Kabyle, and common Kabyle content remains unhandled, including native documentation. In response to this challenge, our approach takes full advantage of the strategy adopted by the TikTaalk project on different stages - the release of the comprehensive Kabyle language resources that have greatly shaped the construction of ASR systems. At present, for a majority of Kabyle speech-related tasks, no well-established models and tools have been developed, and the Kaggle speech community is still eagerly awaiting the much-needed data. As a comprehensive case study to thoroughly examine and assess the effectiveness of the test-based approach, we undertook the ambitious task of transcribing the captivating stories and heartfelt testimonies encompassed within the corpus that we meticulously integrated into Tiktaalik, the exceptional online database that constitutes the core of the project. The selection of this particular corpus was predominantly driven by two principal factors that deeply influenced our decision-making process: firstly, its relatively modest volume, which afforded us the unique opportunity to diligently scrutinize and validate each transcription decision while ensuring a remarkable level of consistency; and secondly, the invaluable presence of preexisting transcriptions meticulously crafted using both the Latin and Tifinagh alphabets, which inadvertently served as an invaluable source for the meticulous task of validation. Our esteemed dataset comprises an array of stories and testimonies delicately crafted by ten highly skilled and native speakers of Tiddukla (Lacet + O.) hailing from four distinct and

captivating generations. All of the files within this remarkable corpus are meticulously preserved in the widely recognized mp3 format, with an astonishing total runtime reaching a staggering 168 minutes, brimming with an unparalleled level of cultural richness and linguistic diversity. The arduous journey to achieve an exceptional level of accuracy and proficiency commenced with the initiation of the comprehensive training phase, artfully leveraging a transcribed video that ingeniously intertwined audio and visual components to convey its profound message. We embarked on the awe-inspiring task of transcribing the already transcribed stories, skillfully rendering them into the exquisite Tiddukla Latin script, all while effortlessly incorporating the corresponding moraic boundaries at strategic junctures to ensure utmost precision and adherence to linguistic principles (Goodman, Jane E. 2005) .In parallel, with the invaluable assistance of the meticulously crafted Tiddukla transcriptions, we meticulously introduced the vitally crucial moraic boundaries within the original transcript of the video, originally composed utilizing the enchanting Tifinagh script. Each and every annotation verification meeting played an indispensable role in fine-tuning and perfecting the insertion intervals of these moraic boundaries, thereby enveloping the entire process with an unwavering commitment to precision and consistency. The invaluable insights garnered from these meetings of intense scrutiny and deliberation resulted in meticulous adjustments and refinements, conducted twice over to guarantee a transcendent level of consistency and accuracy that truly resonates with the core objectives of this exceptional endeavor.

9. Best Practices for Harnessing Digital Tools

To thrive in a digital age, the innovative use of digital tools can empower the harnessing of oral tradition as part of the tangible and intangible Kabyle cultural heritage. In this article, the oral tradition is defined as Kabyle oral heritage that can be thought of as storytelling, music, riddles, and proverbs. Digital tools encompass all technologies of digitalization. One method allows re-creating immersive digital environments as tools for rendering oral stories, riddles, and proverbs immersively as part of the Kabyle cultural heritage; with a focus on storytelling as one of the most important theaters for the living oral tradition, two storytelling modes: talk-story and scroll-to-see-story, as parts of the Kabyle heritage, are examined. A set of best practices that are derived from the relationship concern between technology, culture, and community, are then presented.

Cultural heritage is composed of what we have inherited from prior generations, a source of culture and a legacy for current cultural involvement. For Kabyles – individuals from North Africa's largest group of Berber- speaking people, the Kabyle oral tradition, known as tagrest (pronounced ta- GIRT), encompassing the arts of storytelling, proverbs, riddles, and music, is a vital component of Kabyle culture. Unfortunately, the features that have shaped this rich oral tradition – producing it by talking, and performing it by navigating the rhythm of the human voice – are today at risk of disappearing due to high

mobility, climate change, and the impact of digitalism. In this modern era, where the world is constantly evolving, we find ourselves facing challenges that threaten the preservation of Kabyle culture. The rapid pace of life, influenced by globalization, has led to increased mobility among individuals, resulting in a disconnect from their traditional roots. Furthermore, the effects of climate change have begun to take a toll on the natural environment that has long served as a backdrop for the oral traditions, making it difficult for future generations to witness the authentic beauty of Kabyle culture. Moreover, the emergence of digitalism, while providing numerous advancements and conveniences, has also posed a threat to the very essence of Kabyle cultural heritage. The widespread adoption of digital technologies has shifted the focus towards virtual realms, distancing individuals from tangible experiences and the deep-rooted traditions that have been passed down from one generation to the next. However, amidst these challenges, there is hope. The same digital tools that have contributed to the erosion of cultural heritage can also play a significant role in its preservation and revitalization. By embracing these empowering technologies, we can create platforms that serve as repositories of Kabyle oral traditions, ensuring that they are not lost to the sands of time. Through the use of digital mediums, such as online databases, interactive applications, and social media platforms, Kabyle communities can share their rich cultural heritage with a wider audience, transcending geographical boundaries and bridging the gap between generations. Furthermore, the interaction facilitated by digital platforms allows for the interplay between different expressions of Kabyle culture, fostering a sense of unity and cohesion within the local communities. By engaging with cultural heritage through digital means, individuals can forge connections with their past, reinforcing their cultural identity and instilling a sense of pride. This digital engagement acts as a catalyst for resilience, empowering Kabyle communities to navigate the challenges of the modern world while keeping their traditions alive. In conclusion, while the threats to Kabyle oral tradition are real and multi-faceted, it is essential to recognize the potential of digital tools in preserving and sharing cultural heritage. By harnessing the power of technology, we can bridge the gap between the past and the present, ensuring the vibrancy and longevity of Kabyle culture for future generations to come.

10. Future Directions

The digital editions and wider corpora, which also integrate film collections on these genres, interconnect with other similar resources on other oral-musical traditions in the world. The consolidation of these digital resources would make our cyber-platform a major player in an international network and a hub for coordinating digital archives and exchanging best practice on methods of digitizing and method terms of tagging with precise metadata such resources. This would also further amount to a digitized worldwide ethnomusicological heritage of great significance. More importantly, developing such projective networks will boost the preservation and protection of living oral tradition, encouraging an active engagement with digital media. The first relates to the

development of innovative ways to visualize, represent, and share the derived data. Out of a growing corpus of Muslim oral- musical genre (texts, audio recordings, socio-musical and socio-textual dimensions), digital editions, which provide representations of the singing melodies of each genre together with the words of the song, are presented for pedagogical as well as diffusion purposes, not to mention to aid studies of melodic phrases and their relationships and formations. We plan to extend such editions to other genres such as Chaâbi (folksong), Hawzi, Gharnati, or even the classical Mâlûf. It is possible to develop educational tools that visualize the rendering of those texts as melody, preferably with the possibility to replay parts and select words or digits as they are heard. Using the TEI (Text Encoding Initiative) for describing such editions would enable sophisticated text-level search capabilities such as identifying to which melodic phrase(s) a given word belongs. Expanding upon these ideas, the implementation of innovative techniques for visualizing, representing, and sharing the derived data becomes vital. In order to cater to the increasing collection of Muslim oral- musical genre materials, including texts, audio recordings, socio-musical, and socio-textual dimensions, we are introducing digital editions that offer comprehensive portrayals of the singing melodies accompanying each genre, along with the lyrics of the songs themselves. These editions serve multiple purposes, ranging from pedagogical applications to wider dissemination of these musical treasures. Moreover, their existence aids in the intricate study of melodic phrases and their intricate relationships and formations. Our ambitions extend beyond the current scope, and we intend to expand these editions to encompass other genres like Chaâbi (folksong), Hawzi, Gharnati, and even the classical Mâlûf. By doing so, we can cultivate a diverse range of musical experiences and provide educational tools tailored to suit various preferences. These tools will enable users to visualize the rendering of the texts in the form of melodies, allowing for a more immersive and engaging experience. Additionally, users will have the ability to replay specific parts of the melodies and selectively choose words or digits to be highlighted as they are heard, facilitating a deeper understanding and appreciation of the intricate details within the music. To achieve this, we propose utilizing the TEI (Text Encoding Initiative) for describing these editions. The implementation of TEI would empower us with sophisticated text-level search capabilities, enabling seamless identification of the melodic phrase(s) to which a given word belongs. This powerful feature not only enriches the educational experience but also offers researchers and enthusiasts an in-depth exploration of these oral-musical genres, enhancing their understanding of the vibrant traditions they encapsulate.

Conclusion

One of the goals of having such a multidisciplinary collaborative that includes digital humanists, oral tradition specialists, as well as community stakeholders is to address complex, multidimensional social problems. Alongside working with stakeholders, there was a conscious decision to use a variety of approaches. This included involving community members in the co-

creation and use of digital tools, using digital tools for data acquisition and the concept of participation, as well as taking into account how to preserve intellectual property related to Kabyle oral traditions during and after digitization. It is important to acknowledge that some of the challenges raised by the field included the potential discursive conflict between tradition holders and diaspora community members, addressing the final management and accuracy issues of oral tradition data, as well as the audience that some of the digital content was targeted. The project developed a comprehensive and expansive digital archive for Kabyle oral tradition with the primary objective of preserving and promoting the rich cultural knowledge inherent in this centuries-old heritage. By actively addressing various critical issues concerning the transmission, sustainability, and safeguarding of Kabyle heritage, including intergenerational continuity, waning interest among younger generations, and the palpable influence of globalization, the project has undertaken a multi-faceted approach to secure and celebrate this invaluable legacy. Through a collaborative effort involving tradition holders, scholars, and dedicated community members, the project has fostered a platform for profound reflection on the aforementioned challenges. This collective endeavor has yielded remarkable results, as it has led to the development of cutting-edge digital tools that significantly enhance the visibility and accessibility of Kabyle heritage on a global scale. Furthermore, these endeavors have also opened up exciting new possibilities for media alternatives, revolutionizing and redefining the very essence and significance of script-based oral culture within the Kabyle community. Extensive and insightful interviews conducted with a diverse array of individuals belonging to different segments of the Kabyle community—ranging from revered tradition holders, respected scholars, to humble villagers—have provided invaluable perspectives. It is through these interactions and the feedback received from avid users of the digital archive that the viability and effectiveness of this approach have come to light. These interviews and user responses have served as a catalyst for greater understanding of the multifaceted challenges faced by traditional Afro-Asiatic communities in today's rapidly evolving world. In conclusion, the establishment of this groundbreaking digital archive has had a transformative impact, transcending geographical, generational, and cultural boundaries to reveal a profound appreciation for Kabyle oral tradition. By harnessing the power of technology, fostering collaboration, and embracing the wisdom of tradition, the project has accomplished its objectives of preserving and promoting the Kabyle cultural heritage, making significant strides towards ensuring its viability and vitality for generations to come.

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