

While the use of games to foster the preservation of cultural heritage seems to be an effective solution, we lack a discussion on how it can promote community-based heritage. This article introduces the topic from the point of view of software and game developers.

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Empowering Community-Based Heritage through Gaming: A Developer's Perspective

In recent years, video games have become the most influential product in the entertainment sector. This growth is due to the existence of different types of games, which can appeal to every kind of player and their individual tastes. Additionally, the impetuous expansion of mobile-phone games boosted this growth.²⁶ Nowadays, everyone has a mobile phone that can run almost every mobile game. With some exceptions, mobile games are easy to understand

and require less effort from users: They can be played at any time, and the playing time is shorter than on other gaming platforms. This characteristic comes in handy if we want to impart concepts not related to games or teach notions and knowledge to others.

Among the approaches used to teach non-game elements, the most distinguished ones are *gamification* and *game-based learning*. While these two approaches are based on the activity of *gaming*,⁶ which often consists of a well-structured and rule-based activity (as opposed to the more “free” *playing*), they are separated by the total or partial presence of game *elements*.³ Indeed, we refer to gamification as “the use of game design elements in non-game contexts.”¹⁰ On the other hand, the game-based approach aims to provide learning outcomes from a given gameplay.³⁵ In Plass et al.,³⁰ this distinction is well defined by using an example based on homework: A gamified approach involves giving the learner ranking and points after completion of, for example, an exercise, while in game-based learning, the activity is totally redesigned and homework is included in a more regulated environment to provide better engagement. With an abuse of notation, we will refer to these two techniques as *games* from now on.

Teachers and educators often distrust games in educational environ-

» key insights

- **Cultural heritage is not only a matter of material goods; it also encompasses the immaterial heritage belonging to low-density and rural communities. We can refer to this category as *community-based heritage*.**
- **As developers, we are called to empower this type of heritage together with other actors through digital and innovative approaches, including gaming solutions.**
- **We need to understand the challenges of developing games for communities. Using three running examples, we dig into the technical and social aspects of developing for rural communities and how we can actively involve them.**



Figure 1. Sarnano at dawn.



ments. Bourgonjon et al.² even propose an evaluation model for describing said acceptance and predicting how the interviewed actors react to the use of games in school. However, the benefits of using games in learning contexts have been widely discussed in the literature. For example, in Feng Liu and Chen,¹⁸ a card game is proposed to a group of students to improve their scientific knowledge in transportation and energy. This approach can even benefit from more advanced technologies, as discussed in Pellas et al.,²⁷ which offers a systematic review with suggestions and advice for developing *augmented reality* applications for learning contexts. Bray and Hosein⁴ propose a set of guidelines educators should follow to improve their teaching through the use of video games. The content has been issued by Video Games Europe and European Schoolnet, two non-profit organizations aiming to partner with European education stakeholders (ministries, schools, educators). The goal of the project was to train educators around Europe “on the use of commercial video games as pedagogical support in the classroom.” Indeed, the book is a powerful tool for understanding how games can positively shape lectures. The numerous examples enable readers to begin working with their classes immediately. Among these scenarios, consider the one based on Magellan’s story and the first circumnavigation. This case touches on many interesting educational topics: languages, citizenship, math, and, of course, history. Indeed,

the document shows a group of short activities to be proposed to the classrooms, starting with playing *Microsoft Flight Simulator X*. This helps the students understand how Magellan succeeded in his mission and the historical and cultural context around 1500.

As history, and generally *cultural heritage* (CH), is often used as the meaning of gamified and game-based applications,^{19,20} they permit the user to access and learn the past in a fun way. In other words, we can use these solutions for preservation. Preserving CH has always been a crucial task. UNESCO³⁸ defines cultural heritage as the inclusion of “artefacts, monuments, a group of buildings and sites, museums that have a diversity of values including symbolic, historic, artistic, aesthetic, ethnological or anthropological, scientific and social significance.” Additionally, cultural heritage “includes tangible heritage (movable, immobile and underwater), intangible cultural heritage embedded into cultural, and natural heritage artefacts, sites or monuments.” With the advent and improvement of computing methods, we can confront the preservation issue more easily today,¹⁵ containing a rich group of 3D technologies used in CH. The use of *serious games* and gamified applications in CH contexts is looked upon by many institutions and museums to provide immersive and entertaining experiences. Consider “A Night in the Forum,” a virtual reality (VR) experience published in the Sony PlayStation store.²⁹ The authors define the

product as an *environmental educational narrative* video game, where the player has to find hints and resolve challenges in a realistic environment. The game’s main characteristic is to provide a perfect (or at least faithful) reconstruction of the palaces and historical locations of the Forum of Augustus in Rome. A subsequent work²⁸ shows the results of administering the game to a group of candidates, confirming the positive effects of learning non-game elements through a gaming environment.

However, CH does not always refer to physical objects or structures (*tangible*) but also includes immaterial things. While the first category is easier to represent with computing methods, immaterial heritage may require a bigger effort. Promoting immaterial heritage means, for instance, promoting cultural practices³³ or oral traditions.³⁹ In this context, researchers are challenged to find ways to capture the immateriality of passed-on stories and folklore. This heritage belongs to the collective memories of communities and is usually double-tied with the material heritage. As a consequence, we cannot discuss CH without considering the local communities and their stories: We need to talk about *community-based heritage* (CbH) and, in this case, how we can empower it through gaming solutions.

From a developer’s point of view, what can we do to represent CbH? What are the challenges game developers may face while developing a serious game or a gamified application about communities? What are the actual solutions that deal with this topic? In this article, we introduce the topic of developing games for CbH, by first defining the matter and showing some case studies. Then, we try to understand the importance of such projects and the challenges for developers. Finally, we conclude with remarks on possible future directions.

Defining Community-Based Heritage

Both material and immaterial CH are rooted in the communities and civilizations that inhabit those places. The formal definition of CbH can be derived from the 2005 Faro Convention.²⁵ In Article 2 of Treaty 199, the

Council of Europe defines *heritage community* as a group “of people who value specific aspects of cultural heritage.” In addition, these individuals “wish, within the framework of public action, to sustain and transmit” the concerned aspects of their heritage “to future generations.” From this definition, we can derive that communities may refer to individual citizens and collective actors. Indeed, a single person may be the keeper of a story that happened in a personal context that impacted the collectivity. Vice versa, the collectivity can impact the stories of each individual. This generates intricacies of stories and memories that may be difficult to communicate in an effective way. Moreover, CbH is often treasured in rural and low-density areas, as opposed to known stories and visible heritage that are usually preserved in socioeconomically developed areas.

Apart from the formal definition, we should also consider some social aspects to deepen the discussion on CbH and have better insight on the topic. As we will discuss later, low-density communities are usually “reserved.” Gaining access to the communities requires time and respect toward the habits and customs of said communities. The discussion on how we can gain credibility in these communities is broader and requires more studies on the matter. However, we can describe some starting points based on the idea of respecting low-density areas and thus CbH. In this section, we try to identify three main concepts to aid in defining CbH, which can be summarized as follows:

- *Remembering the past.* Many stories about communities are kept in the *past*; thus, they should be retold in a new way.

- *Educating about communities.* Possible audiences should be educated to avoid alteration of the communities.

- *Loving our roots.* Our life has roots in a community, and expressing our point of view on it could provide better insight.

To convey these other ideas, we show three different case studies based on existing games; we use these three examples as a good representation of the previously listed concepts. Indeed, each one, through its lenses, manages to set the game in some sort



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of low-density place (fictional or inspired by real ones), and to reason on how underserved communities should be treated with respect. Moreover, for each of the case studies, we include in the discussion a learning outcome that can be used to promote CbH.

Remembering the past. From another point of view, CbH should be about the remembrance of the past. While many details can be easily found online, we need to dig into communities' stories to have a clear picture of past events. Books, manuscripts, and, most importantly, oral traditions allow us to untangle the hidden knots of the intricate history of a community. This is the case of *A Painter's Tale: Curon, 1950*, a video game based on the infamous story of the submerged town of Curon, in Italy's Trentino Alto Adige region.

In 1950, the *Montecatini* industrial company won the contract to build a dam and merge the two smaller natural lakes of Curon and Resia. Unfortunately, the area where the new dam should have been built was exactly the towns of Curon and Resia (both lakes and towns had the same names). The inhabitants of the small village were forced to leave their houses and move to the newer village (called Curon Venosta), close to the new artificial lake created by the dam. Every house was torn down, except for the bell tower that still emerges from the lake today.

The game is set right before the flooding of Curon, and the whole story can be seen as the protagonist's dream after getting “captured” by a mysterious siren in the middle of the lake. The developers re-created some portions of the old town using both realistic and *voxel* graphics.^a As we can see in Figure 2, we can recognize the typical architectural style of the Tirolo region's houses, enclosed in the valleys of the Alps. The process required the developers to profoundly study the old maps and photos, preserved in the Curon Venosta's archives. While the history and some of the characters are real, the game presents an original narrative that guides the player through the events of the game. In this way, the game can be considered a true inter-

^a Voxels can be considered as “three-dimensional” pixels with spatial properties.

active experience rather than a mere documentary.

Naul and Liu²⁴ demonstrate the effectiveness of overlapping fictional narratives with real history by reviewing many serious games. In fact, the paper underlines how the inclusion of narratives improves the general experience of players. This results in better immersion, with greater learning outcomes for the players. Additionally, among the benefits of mixing fiction and real stories, users are more engaged while playing the game and motivated to continue and discover more about the narration and the contextual history. *A Painter's Tale* perfectly embodies the idea of overlapping an original narrative (the protagonist's dream) to the real history (the evacuation and successive flooding of Curon), allowing us, the players, to experience in first person what the original inhabitants may have felt during those events.

Educate about communities. Creating a correct representation of communities is a hard task. However, a proper narration within the game can educate the player to respect said communities. Usually, rural areas are not used to overtourism and it may cause distress among low-density communities.^{5,7} In this context, *Dungeons of Hinterberg* aims to educate players about the risks of having an uncontrolled flux of tourists without the right capacities for hosting them.

The game is set in Hinterberg, a fictional Austrian town located in the Alps inspired by towns such as Bad Gastein and Hallstatt. The protagonist, Luisa, decides to leave the corporate life of Vienna to reach Hinterberg. This little town has gained a lot of popularity due to the presence of magic dungeons, which have become an attraction for those who are interested in slaying monsters and folkloristic creatures alike. During her stay, Luisa faces many strange enemies while uncovering the mysteries of Hinterberg and understanding why the town is falling apart.

While the general atmosphere of *Dungeons of Hinterberg* may seem colorful (Figure 3) and the player has to fight hordes of monsters thanks to playful gameplay, the developers still want to remark on some important social aspects, such as social dynamics,



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environmental preservation, and, of course, the problems induced by overtourism. Through interactions with the inhabitants and adventurers of Hinterberg, we can understand the underlying issues of the town. These social mechanics allow the player to understand the plurality of the different actors and how they reason on the topic. Indeed, each of these characters has their beliefs and opinions about how tourism in Hinterberg is managed: Some are worried about the destiny of the town, others are concerned about their impact on the overtourism issue, while others want to totally exploit the situation for their own benefit.

Dungeons of Hinterberg is a commercial game, and the development studio does not aim to educate the player directly. When this happens, we can talk about *tangential learning*. The term was first introduced in 2008 by Daniel Floyd in a video-blog^b and refers to a process where a non-educational game educates the player, who becomes aware and curious about a referenced topic.³⁷ In the case of *Dungeons of Hinterberg*, the players find themselves fighting against a more subtle enemy, something that cannot be killed by swords and cantrips. Indeed, only through awareness of the matter can we contrast a kind of tourism that puts low-density areas and smaller towns at risk.

Love our roots. Sometimes, CbH starts from ourselves and our roots. Our personal heritage can have a meaningful impact on the story of our town, and narrating it from our point of view can expand the heritage of low-density areas. An interesting case study of how personal memories can be the foundation of a town's history is *InMente—Isole di Memoria*.

This short serious game is based on the life of Carlo Alianello, an Italian teacher and writer who lived between 1914 and 1981. The story is presented as an imaginary interview with the writer (Figure 4), who narrates the main events of his life through a series of “isles of memory.” From his youth, spent with his mother in different places in Italy, to his adulthood set in more academic contexts, we are called to unravel his story of how

^b The video is available at <https://tinyurl.com/2b9jjpvy>

he contributed to the heritage of his mother's little hometown of Tito, in southern Italy.

The game is composed of a set of levels (the memory isles) referring to one of the key moments of Carlo's life. Each level hides six memory droplets that unlock a short anecdote about the related level. For example, on the island of memory about Carlo's Tuscanian years, one of his memories is about his days in school and his interaction with his teacher. On the level set in Tito, Carlo remembers the calm and wellness of a slow-paced life. Once the player has collected all the droplets, these can be spent in the in-game shop to unlock photos and other objects that belonged to Carlo and are preserved in the "Fondo Carlo Alianello" collection in Tito.

The game's main goal is to share the story of Carlo Alianello. To deepen the knowledge of Carlo's story, the player is invited to visit the town of Tito upon the conclusion of the game. While there is no data yet available to confirm the effectiveness of this call, we already know that games are able to increase the number of visitors to a town or museum. The best-known example is the increase in tourists in Monteriggioni (Tuscany, Italy) after the distribution of *Assassin's Creed II*,⁸ but of course, it is not the only one. In the literature, we can find many examples of the benefits of using gaming solutions to promote tourism.^{32,40} This phenomenon is called *videogame-induced tourism*,³¹ meaning players tend to visit those places that influenced their favorite game.

The Developers' Challenges

With the digitization of CH, we are able to share the stories and roots of our past with bigger audiences.³⁶ There is no doubt that digital solutions have democratized the ability to enjoy CH from anywhere. Additionally, gamified apps and games in general are more entertaining than classic digital solutions. We should exploit gaming to convey important messages and teach children and adults alike about history. Even the European Union^c is promoting, through grants and other

c For more details, the reader may be interested in <https://culture.ec.europa.eu/>

Figure 2. Screenshot from *A Painter's Tale: Curon, 1950*.



Figure 3. Screenshot from *Dungeons of Hinterberg*.



Figure 4. Screenshot from *InMente—Isole di Memoria*.



initiatives, the efforts of all the European countries and companies (e.g., the developers of *InMente*) that want to valorize their CH. Keeping this in mind, we definitely have the tools for efficiently narrating CbH. We are referring to a type of heritage that is often immaterial. Moreover, low-density areas suffer from depopulation,¹ with the risk of losing forever the heritage of these sites. The need to preserve CbH is clear. We need to come up with solutions to foster best practices and methods for protecting CbH. However, as software (and game) developers, what can we do from our side? What are some of the challenges of developing gaming solutions to preserve CbH? To answer these questions, the developers of the three considered case studies were helpful.

A game about CbH must capture the essence of the communities, which has a variety of implications. Habits, traditions, and folklore should be represented from a choral point of view. All of these aspects are entangled with each other; thus, more effort is required by the developers. Indeed, the first main issue in developing games about communities is the necessity to gain credit among them. Let us consider the case of *A Painter's Tale*. The flood of Curon is still an open wound for many of the inhabitants, and the developers of the game had to convince them about the seriousness of the project. The developers of *A Painter's Tale* felt like “invaders” at the beginning, just like those who evicted the inhabitants of the first Curon. They had to visit the small village, chat with local guides, and discuss with the local tourist office before being able to include them in the project. Indeed, the key to a successful community-inspired game is to include the community itself in its development.⁹ Community-based development is indeed a prominent topic for underserved communities. Dillahunt et al.¹² propose a workshop to reflect on methods that can include underserved populations in the design process. During the workshop, the participants are asked to understand and discuss the needs of such a category and the eventual tensions between communities and developers. Le Dantec and Fox¹⁷ focus on sys-

tematically gaining access to low-density communities. Their work tries to organize the different approaches in community-based research, creating guidelines and suggestions to further develop this field. Most importantly, the authors narrate how they engaged with the residents of a community and the skepticism of their work. The experience testifies to how genuine projects can be undermined by distrust (like questioning the affiliation of the researcher/developer) or even by unexpected requests from the community (like immediate benefits and rewards). Moreover, the presented story shows the difficulties of being accredited in a closed community and demonstrates how slowly and gently we have to act as developers to include communities in the creation process. Our final goal is indeed to empower them to be active actors rather than “invaded” ones.

Aside from the ethical considerations of the involvement of communities and the possible obstacles in accomplishing this task, developers should be careful from the beginning of the creation of the experience. Developing a video game has the same basic characteristics as developing any other software. Initial phases of development should lay a solid foundation for the next steps. In the case of game development, we can refer to the initial phase as *game design*. An interested reader can consult Jesse Schell's *The Art of Game Design*.³⁴ During this phase, every member of the team is required to deeply analyze what can be done to work without serious impediments. In this initial phase, development costs are hypothesized and technologies are chosen based on the features of the game. Moreover, this is the phase where game mechanics are conceived, which will serve as a guiding light throughout the development process. A poor game design is often an early symptom of a failing game, which means the unrecoverable loss of time and resources. For this reason, we need to carefully understand *what* the game will be, especially in a fragile context such as CbH.

Municipalities, museums, and local authorities are key actors when deciding the technological aspect of games about CbH. Developers should

be able to discuss the technological sustainability¹³ of a game with the stakeholders and suggest to them which are the best solutions for their needs. The challenge here is to balance all the requirements. A potential starting point could be a *technical feasibility analysis*.¹¹ This part is as important as the *game design phase* and should be deeply discussed with the stakeholders. Indeed, the dangers of a bad analysis of the technical requirements become evident after the start of the development. Museums and municipalities in low-density areas do not have access to large financial assets. An unexpected cost at the end of the development or choosing the wrong tool could totally sink a project, with a subsequent and definitive financial loss for the stakeholder. As developers, we have to know which technologies are available for developing gamification approaches and games and maybe start developing solutions for empowering these types of actors and democratizing gaming solutions for everyone. If we take into account our three case studies, we can imagine that the development of *Dungeons of Hinterberg* required more technical effort from the developers than *A Painter's Tale* or *InMente*. This means a greater need of resources (both financial and human), and, of course, higher risks.

It is also necessary to state clearly what the target of the game is, both from the distribution and the audience points of view. The three case studies are very different from each other: *A Painter's Tale* and *InMente* have simple game mechanics, while *Dungeons of Hinterberg* is more complex; *Dungeons of Hinterberg* and *A Painter's Tale* are available for the console and PC market, *InMente* only for mobile devices. That said, there is no winning formula when deciding the targets of a game. On the contrary, it is crucial to understand the target we are referring to and how we can empower it.²³ In the case of *InMente*, it is obvious that the smartphone market is the best choice. Developing gaming solutions for mobile devices allows developers to reach a great audience. If we only consider the Italian market, in 2024, 74.1% of video game players use mobile devices: If we consider

the raw value, we are talking about 10.4 million mobile gamers (+12.4% against the data of 2023).^d This choice has also been driven by the simple gameplay, which can satisfy many demographic groups. While playing *InMente*, we are not challenged by time constraints or other difficulties: Players are motivated to play a little treasure hunt at their own pace without risks. On the other hand, games like *Dungeons of Hinterberg* focus on a more restricted group of people who play games more often. The game is available only on consoles and PCs, which means the market share is inevitably smaller than that of mobile games. Moreover, even if a “vacation mode” is available for those players looking for a more relaxed experience, *Dungeons of Hinterberg* core gameplay asks us to fight against monsters while avoiding their attacks, which is usually for *challengers*.¹⁴

However, we are missing a fundamental point in the discussion. Many times, learning games tends to be boring, with poor mechanics. These “games” are developed only for educational purposes, without motivating the player. A game cannot exist (and cannot be called a game) without the entertaining component, so every game developer’s toughest task is to create a solid ground for the perfect experience. This concept is well defined in Schell’s book,³⁴ where the author states that we can only prepare the player for the experience because the experience itself is personal. Considering *Dungeons of Hinterberg*, the gameplay mixes action-RPG mechanics (fight the monsters and improve the character) with social sim ones (the relationships with the villagers). We recall that the developers of *Dungeons of Hinterberg*’s main objective is to entertain the player. However, through fun gameplay, they managed to create so-called *flow*, motivate the players to keep playing, and educate them²² through tangential learning. The other two case studies have simpler gameplay mechanics. However, they are still capable of creating a flow state in the players and motivating them to finish the game. Indeed,



A game about community-based heritage must capture the essence of the communities, which has a variety of implications.



the length of the game also influences the experience. Even if *A Painter’s Tale* and *InMente* are relatively short games, they still manage to entertain the player with their narratives.

Conclusion

While cultural heritage is receiving a second life thanks to the advances of the digital world, there is still the risk of losing what is intangible. Even worse, immaterial heritage is often preserved in low-density areas or in small communities that struggle to foster their own heritage. In this case, we are talking about community-based heritage, which can be seen as a rather new paradigm for considering a group of concepts in CH. Indeed, we refer to all the oral traditions and folklore that identify and define a community of a town or a region.

In this article, we tried to introduce the topic of CbH and how we can empower it through games. Using three case studies based on existing games, we identified some basic concepts that are the basis for understanding the meaning of CbH. Moreover, we identified some challenges game developers could face while developing CbH-based gaming solutions. It is clear that this article just scratches the surface of the topic; more investigation and analysis from different perspectives, even from a computer science point of view, are required. The question is: What can we do to expand the scope of research on this topic?

The development of best practices for discussing and developing games about CbH should be the priority. Many games that focus on the stories of communities are available right now; thus, it could be useful to classify them and extract what could be the good methods for developing such games. A first attempt has been made by Karvánková¹⁶ and Miloju and Musteață,²¹ who provide some additional case studies about how gamified experiences can enhance the cultural legacies of Czechia and Romania, respectively. While these two articles focus more on the social aspects of the introduction of games within the CbH context, we cannot forget the technological element. Starting from the questions raised in the section titled The Developers’ Challenges, the idea

^d The report is available at <https://tinyurl.com/27k5fa3n>

is to help developers and technical experts improve and guide them through the development of gaming solutions for CbH. We saw that some may be uninterested (or even skeptical) in using video games to promote their culture. Such guidelines could help software houses in their interactions with municipalities and in convincing these parties by showing them how others have successfully integrated gaming solutions in touristic promotion. Another source of the municipalities' skepticism is the lack of resources (especially financial ones).

To avoid this problem, the focus should be redirected to a more technical point of view. Research on methods and tools for providing cheap yet effective solutions can foster the use of gaming to promote CbH. Concretely, said methodologies should encompass ways to guide developers during the development process. For example, design frameworks should provide solid bases for the prototyping phase. As we discussed, when designing a game or an interactive experience about CbH, developers should consider different characteristics and constraints. Design frameworks can help navigate and address these issues by clearly pointing out what we need to take care of beforehand. Said frameworks can be accompanied by technical tools. As developers, we can create, for example, authoring tools to speed up development processes and provide usable software even for those who do not have coding skills. Indeed, authoring tools provide a guided development environment for publishing standardized applications. Such tools can democratize the development processes and help create experiences even for those without financial resources. As a consequence, partnerships with stakeholders seem mandatory to build a set of best practices for CbH experiences. Interactions between developers and stakeholders can nourish advances on the topic: More interested stakeholders can lead to the development of tools and methodologies, which leads to more accessibility for non-experts. Having more methods and more discussions on the matter can truly help CbH to flourish, allowing us to preserve the hidden heritage of communities.

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