

# Expanding the Mosaic of Transmedia Learning Experiences

## Application of a Transmedia Storyworld in ESL Formal Learning Environments

Patrícia Rodrigues  
Universidade Aberta  
Lisboa Portugal  
1105075@estudante.uab.pt

José Bidarra  
Universidade Aberta  
Lisboa Portugal  
jose.bidarra@uab.pt

### ABSTRACT

This paper sets out to address the gap in current research with respect to the application of transmedia storytelling in educational settings by reporting on the use of a transmedia storyworld in English as a Second Language (ESL) formal learning environments.

It zooms in on students' experiences and perceptions of the transmedia storyworld to take a closer look at how its exploration can foster situated language learning practices by shaping and expanding it. Outputs of this design-based research study indicate students share a positive attitude towards the application of a transmedia learning storyworld in ESL settings and that it allows for the development of socially and culturally contextualized second language acquisition processes.

### CCS CONCEPTS

- Interactive learning environments • Multimedia content creation
- Social media

### KEYWORDS

English as a Second Language (ESL), Situated language learning, Transmedia learning

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### 1 Introduction

Language plays a central role in the way we break up reality into categories and how we label these [1]. While on the one hand language gets situated meaning from contexts, on the other hand, experience in the world gives meaning to language. The social and situated nature of second language acquisition is, however, often disregarded in formal ESL learning environments. Classroom activities are mostly curriculum-centered and tend to focus more on mastering the forms of the language, and less on the experiences students have of it.

Situated language learning, a social process whereby knowledge is co-constructed and is situated in a specific context and embedded within a particular social (physical or online) environment (Gee) [2], is increasingly becoming a topic of discussion within the ESL community, yet it remains mostly unexplored. Both the fields of CALL (Computer-assisted Language Learning) and TELL (Technology-enhanced Language Learning) have over the past two decades reflected “an understanding of literacy as socially bounded and contextual, no longer accessible solely through command of language as traditionally presented in many [foreign language] classrooms” [3]. Studies in these fields, however, scrutinize more the affordances of technological tools for language learning and tend to overlook the contexts in which they are used.

Taking into account the fact that the linguistic and the sociocultural dimensions are interdependent and carry the same weight in the process of language learning [4] urges educators to make a critical reflection of present interactions and means of self-expression performed by students in “a” and “the” transmedia world. In this light, there is also a need to design learning frameworks that prepare students to be active participants as well as proficient communicators in the global community of the present and future.

Through its manifold means of expression, transmedia storytelling is an echo of the pervasiveness and ubiquity of the networked society. It manifests and is the manifestation of meaning-making processes of how individuals construe and make sense of their contexts. As Pringle points out, we live in a storyworld - “Where transmedia was once an option, now it is a necessity. A way of life. [...] The story goes on. Day by day. Minute by minute. Each video, each Tweet. Each Instagram post

and billboard. All adding to the story we weave together. The storyworld, once a concept of transmedia designers, has become a reality" [5].

A transmedia storyworld resembles a mosaic. It is composed of multifarious parts that combined create a larger whole. Each tile brings a unique contribution that impacts the perception of the whole. Similar to the process of composing a mosaic, taking part in this participatory space implies being a co-creator, taking an active role in its definition. Assuming this perspective and acknowledging that students are conveying meaning and understanding the world through transmedia stories, it is thus of the interest to educators to understand how these dialogic spaces, constituting the transmedia story, can be built or exploited.

The application of transmedia practices in educational settings is far from being a straightforward conversion of the media franchise *modi operandi* into teaching and learning processes. Nevertheless, the critical reflection of what a transmedia worldview entails in contemporary discussions about education is not only advantageous but also vital. Putting the existing literature concerning transmedia and education into perspective, it is possible to note that there are many studies indicative of the potential use of transmedia environments in educational settings but the field is relatively new and incipient [6].

Addressing the lack of explicit pedagogical perspectives and knowledge of how transmedia practices can be applied in educational arenas, this paper seeks to provide a contribution to the process of establishing a significant corpus of data on transmedia learning (TL) experiences that may over time properly support advances in the field of transmedia education. Tiles of a mosaic that jointly may provide a clearer depiction of the impact of the use of a transmedia approach within learning environments.

TL, defined by Raybourn as a "scalable system of messages that represent a narrative or core experience that unfolds from the use of multiple media, emotionally engaging learners by involving them personally in the story" [7], allows for the construct of adaptative media-rich learning experiences which are able to support the exploration of curricular content. In this context, the research study this paper seeks to provide an account, explores the hypothesis that acting as a media ecosystem, a transmedia storyworld designed for learning ESL can be used as a multimodal sandbox within which students can gain a higher agency to experience and acquire a second language.

By combining theory and practice through the experimental development and application of an ESL transmedia learning storyworld in formal learning environments, we seek to ignite the discussion of the affordances and constraints that such participatory spaces might entail in educational arenas. The second section of this paper provides insight into the research framework used to explore this matter while the third presents the storyworld - an overview of its design process and the platforms that scaffold the experience of it. The two following sections report on the application of the storyworld - first in two formal learning environments in Portugal, across two cycles of implementation, and then in a Greek formal learning context. From fieldwork to analysis and reflection, the last section of this

paper presents some of the challenges and issues emerging from these experiences and provides an overview of matters to be addressed in future work.

## 2 Research Framework

In the particular setting of this research study, it was assumed that adopting a design-based research (DBR) approach could allow the examination of the use of a TL storyworld in formal learning contexts by relating processes of enactment to outcomes of interest.

A TL storyworld is a participatory space shaped across time through the intervention of its users. It is thus recurrent and subjected to redefinition and resolution in different ways over time, a phenomenon that Coyne classifies in terms of conducting research as a "wicked problem" [8]. Kelly, in the case of wicked problems, particularly when pedagogical content knowledge is scarce, suggests the adoption of a DBR approach [9]. Instead of a narrow Manichean dualism of whether or not it works, the research focus is on how it can work and why (Reeves & McKenney) [10].

More than focusing on acquiring insights on the iterative process of enhancing a learning/research instrument, the underlying goal of selecting a DBR methodology was to facilitate the provision of insights on students' interactions in the TL storyworld and how these could be related to their language learning trajectories.

This research study resorted to a mixed method approach making use of quantitative and qualitative data collection processes to gather information regarding participants, contexts, and the use of the storyworld. Qualitative and quantitative data were used to develop an enhanced perspective by looking at the phenomenon in question from multiple perspectives to ultimately develop different ways of accomplishing reflection.

For the implementation stage, it was necessary to develop instruments that could support the documentation of the experience of the storyworld. These included: data collection regarding participants through surveys; feedback activities during sessions of implementation of the TL storyworld targeted to groups and participants; observation notes and records; semi-structured interviews and the collection of learning artifacts.

Since DBR is constituted by a number of interrelated stages - cycles of invention and revision [11], data gathered in each cycle was informed by and informed other cycles of the process. Jointly, the data collected was used to explore theory-enacting aspects as well as theory-advancing aspects. The first related to the design of a TL storyworld informed by learning frameworks of reference within the field; and the latter targeting the proposal of design guidelines for TL experiences based on the application of the TL storyworld.

## 3 The Storyworld

Connecting Cat (CC) seeks to create a transmedia ecosystem for the development of ESL learning and teaching practices. It is targeted to Portuguese 10th-grade students, 16-17 years-old adolescents. The storyworld seeks to be the setting of exploration

of contents and goals of the Portuguese ESL syllabus, level B1, according to the CEFR (the Common European Framework of Reference for Languages). It targets explicitly core topics identified for the English subject, in the Portuguese national curriculum of secondary education - media culture, multiculturalism, linguistic diversity and use of technology.

The overarching aim of this TL storyworld is to stimulate the emergence of a participatory space by engaging students in a story that they can expand and unfold while developing activities and processes that on the one hand can promote the application of their communication skills and on the other support the enhancement of their (trans)media skills.

Through the use of different forms of mediation - text, sound, and imagery, which convey world information, and media platforms, selected taking into consideration students' experiences of the online world, CC attempts to be a space in which students can explore the language in a situated and contextualized form, one that allows for the mediated experience of the networked world.

### 3.1 Worldbuilding Aspects

This storyworld's backdrop is an adventure story in which the protagonist seeks portal pieces across different locations to ultimately connect humans to a tribe of alien warriors, the Fluxus. Cat, a teenage girl, living in a city by the sea in Portugal, is a seeker of the Fluxus tribe with the mission to assemble a portal that allows the Fluxus to interact with humans. To collect the pieces of this device, Cat relies on her cat, a Fluxus warrior on the mission of helping and protecting her on planet Earth. Together they attempt to connect both worlds. Cat's quests unfold through direct interventions of the participants in the storyworld.

Two parameters informed the selection of the platforms to bring this storyworld into existence: their features and potential for the development of learning activities in the context of ESL and also online spaces and media consumption preferences of the target audience.

An online survey disseminated across social media platforms served the purpose of exploring the latter. Specifically, in what concerns platforms preferences, all participants of this exploratory survey, 61, were active on Facebook. Besides this social media platform, video platforms such as YouTube or Vimeo came second (89,3%) in their preferences, and blogging platforms such as Tumblr ranked third (39,3%). Video game platforms were also part of the participants' online experiences (23,2%). In terms of the use of social media, staying in touch with family and friends was the primary activity (93,4%). Online spaces were often used by participants to share photos, videos, and music (55,7%) and to further deepen their interest in music, films, and books (50,8%). Also noteworthy is the fact that merely 6.6% reported using media platforms to advocate for a cause.

Through this preliminary collection of data, the design of learning activities in the storyworld could then be informed, shaped and contextualized with cultural and social references; styles, visual and audio cues that students could recognize and be responsive to.

At root, CC attempts to reach students by exploring the audiovisual language in a diversified form and through learning challenges that can be explored either collaboratively or autonomously. There is no single route to learning a language; therefore, the design of this storyworld attempted to diversify points of exploration of content.

Drawing from the multiliteracy training approach [12], proposed by Kurek and Hauck, students' interactions within the storyworld were scaffolded around the following sequence: reception, participation, and contribution. "Similarly to what is happening in a language classroom, the learner is guided from observation of the desired acts, through their interpretation to the final performance, with the teacher gradually withdrawing support" [12]. Considering this pedagogical sequence implied selecting platforms that could expose students to learning inputs and others that could trigger the creation of learning outputs and engage students in taking an active role. The different gateways to the storyworld were set forth via a common interface - CC's website [13], the hub of the storyworld.

So that students could relate to the topics in a seamless way, particular attention was given to the creation of a convincing storyworld but also to the design of the characters. To avoid the cognitive overload inherent to the exposure to multimodal inputs, the contents are presented through a storyline with clearly defined points. The story is supported by a main narrative arc, in turn, constituted by micro-narratives. These were crafted to address a particular curricular topic to facilitate the management of learning goals. Regardless students explore the storyworld in a linear or non-linear way, the micro-narratives are comprehensible on their own, even when explored outside the main narrative framework and encapsulate the necessary context to explore the topics.

CC draws upon the hero's journey model, one that students can relate to. Similarly to the main character's journey, students face challenges, meet mentors, and are called to develop their skills as they set off on their academic route. The underlying goal was to create an emotional connection and inherently stimulate the engagement with the content embedded in the narrative. Campbell's monomyth structure is flexible and reusable and thus suitable for the development of transmedia practices. Despite the fact that the narrative design was based on the hero's journey, the experience that CC attempts to provide is, in essence, a collective journey [14]. Unfolding the story becomes the prime goal of the collective. It is "the event that throws the individuals into the shared experience" (Zuckerman) [14].

The storyworld is intentionally incomplete and seeks to engage students in shaping, expanding it, and filling in the narrative gaps. By exploring the storyworld, students learn more about it and become immersed in it and can potentially bring their worldviews into it by expanding it.

### 3.2 The Storyworld's Building Blocks

The following is a brief description of the platforms of CC. The first three targeted to provide learning inputs students can explore.

"Who am I" is a webisode that establishes the essence of the story - characters, setting, and challenges. In this webisode, the

main character is confronted with the revelation of her secret alien identity and mission. The webisode integrates a clue to two other narratives threads set in the storyworld. The webisode can be explored to raise awareness of diverse types of linguistic discourse and discursive practices in the second language. Students can critically evaluate discourse and develop conversation skills using the webisode as a setting.

"Allure" is a motion book sequence that exploits the culture and life of the alien tribe, the Fluxus. The user is invited to track the warrior Shakid from the moment he morphs from a cat, in the real world, into a Fluxus warrior; follow a rescue mission on the Fluxus territory and his return to planet Earth. The events were intentionally designed to target the topic of linguistic diversity. "Allure" adapts the graphic conventions of comic books and combines static art, simple animation, and sound to create a movie-like feel within the comic. As a result, it presents the potential to explore receptive communication skills and reinforce meaning through different modes of representation.

"Seek and you shall find" is an interactive video making use of choose-your-own-adventure mechanics. Both the setting and the characters' interactions were intentionally integrated to exploit the topics of linguistic diversity and multiculturalism. Students are called to embark on an adventure set in London to find a portal piece while exploring learning inputs such as discourses representing diverse cultures, genres, communication modes, and language varieties.

The three narrative threads explored through these platforms are interconnected and further develop events of the main narrative arc. The storyworld also integrates four platforms targeted to triggering the production of learning outputs.

The "Fluxus Logs" is a blog that aims at being a repository of knowledge "seeds" collected by humans about planet Earth and its inhabitants. As co-creators of the storyworld, students can give their contribution to the repository. Posts on the blog include challenges that might encourage students to create, collaboratively, or on their own, digital artifacts such as wikis, podcasts, videos, or any other form of digital creation. More than engaging students in the topics, the goal was to activate prior knowledge as well as develop media literacy skills. By encouraging creative self-expression, students can activate previously acquired knowledge and skills; remix and recycle modes, genres, and symbols to forge new interpretations and representations of the storyworld.

Cat's Facebook posts seek to immerse students in her quests by sharing her impressions of the places she has been. Through this platform, students are encouraged to expand their knowledge on the learning topics explored in the webisode, motion book sequence and interactive video. It also constitutes a vast territory of opportunities to develop accuracy on the linguistic level while using mechanisms of self-expression. Cat's posts can be explored to address discourse issues such as argumentation and negotiation skills, pragmatic competence, or netiquette in the second language. This platform was also used to trigger the expansion of the storyworld by giving students the opportunity to create new narrative threads, bring their worldviews into CC's storyworld

and shape it in accordance with their intentions. A post on Cat's Facebook page sets the student on an open-ended quest to help Cat to solve the mystery of a missing person, a guardian of a portal piece. To progress through the experience, students are provided with a set of clues that must be explored via QR codes and an AR trigger. The last clue leaves participants at the point where the guardian was last seen. From this location and based on the information they have gathered, participants are asked to formulate hypotheses regarding what happened to the guardian and create original stories within the storyworld.

Cat's Instagram page was added to the storyworld as a result of the first implementation cycle (described in the next section). Taking into account students' feedback, posts on this platform allow them to identify places and pivotal moments of the story. Similar to the strategy used on Facebook, Cat's Instagram profile integrates photos targeted to engage students in the discussion of the curricular topics in focus in this storyworld. Additionally taking advantage of the use of visual elements to reinforce meaning, photos were used to explore expressions and vocabulary to expand students' language repertoire.

The "Ed Tribe" (or Community) is a platform specifically targeted to the use of the storyworld in learning contexts. It is set in Edmodo - a platform that integrates social networking and communication features that promote involvement in collaborative and creative practices both in the classroom and outside. The goal was to create a space for the community of students and teachers to share resources and content related to the storyworld.

Taking into account feedback provided by ESL teachers, three exploration guides concerning the input and output platforms of the storyworld were added to the already existing resources in CC. Activities and pedagogical proposals provided on the guides [15] are varied and attempt to cover a wide range of approaches that might be applied to explore CC's world. The guides are segmented and sequenced according to the events presented on the storyworld across the different platforms. In terms of format, the three guides are interactive pdf files. Thus, providing platform-agnostic resources that allow educators to surpass possible technological constraints and challenges they may face in their educational communities.

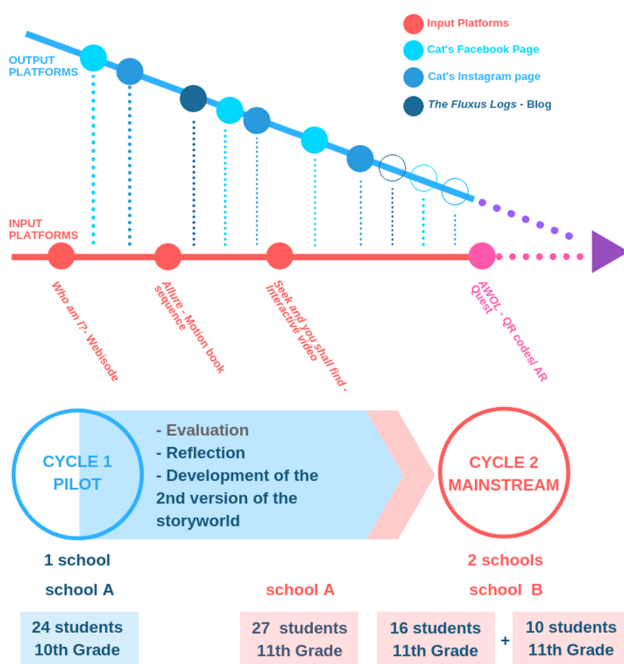
Figure one represents a proposal of navigation within the storyworld that allows for an overall experience of the events set in the storyworld by moving across cycles of observation to participation and contribution. The presented route is intentionally incomplete and is referent to a possible starting point of a route within the storyworld, suggesting that the expansion of it is to be pursued by CC's users.

#### 4 Implementing a Storyworld for ESL Learning

CC was from inception bottom-up informed and sought to be a mediational artifact, meaning that the systematical refinement of the storyworld could progressively, over time, support teaching and learning processes of the targeted language in a more attuned way to the needs of its users.

The implementation stage of this storyworld was constituted by two cycles. The first, a pilot implementation with the goal to establish the potential of the storyworld and the second a mainstream cycle to explore how the storyworld could be used to enhance learning. Both cycles were developed across two to three 90 minutes sessions. Participants of these two cycles of research were 10th and 11th-grade students of two Portuguese secondary schools. The classes/sessions were co-managed with the teacher, and the researcher took part in the experience as an observer and participant. Throughout the sessions, student and teacher observation and interviews were conducted, and learning artifacts collected.

Participants of both cycles of research completed a preliminary survey targeting their media use and production preferences as well as their perceptions towards the use of a TL storyworld in ESL learning contexts. Additionally to feedback activities during the sessions, at the end of each cycle, participants provided feedback regarding their experience of the storyworld through a survey targeting the platforms they had access to, the story, as well as activities they had developed related to it. The following presents the distribution of the research cycles.



**Figure 1: Possible route of exploration of the storyworld and overview of the two cycles of implementation.**

#### 4.1 The Pilot Implementation Cycle

The primary goal of the first cycle of implementation was to acquire feedback of potential end-users of CC to further develop the storyworld. Taking into account the goals of the pilot study the pedagogical sequence: reception, participation, contribution was not applied at this point in time. The storyworld prototype version

was explored in three 90-minutes ESL classes with 24 tenth-grade students at an urban secondary school in Portugal.

At the time of the first implementation, CC was not fully developed; it was instead a working prototype. The storyworld was constituted by the core input platforms and integrated the primary output platforms with no additional resources of exploration. In comparison with the last implemented version, the first did not include the Instagram platform; the main interface to the storyworld only had navigational cues at the top right corner of the site; the navigational menu of the interactive video did not allow for revision of video blocks without completing the viewing; Cat's Facebook profile was not public and solely contained a hand full of posts for exploratory purposes.

Prior to the first session, students completed the preliminary survey regarding their media consumption habits. The collection of data regarding platform preferences indicated that the students preferred to use Facebook to interact with friends - more than 90%, but some frequently interacted with peers on the Tumblr and Instagram platforms (36%). 70% reported playing multiplayer online games and indicated a preference for action, and adventure games such as League of Legends or GTA V. Only a small percentage of students reported disagreeing with the use of social media platforms for learning. However, a significant amount of participants considered their mobile devices to be a distraction for learning - 12,5% strongly agreed it was a distraction, and 16,7% agreed that mobile devices were distracting. Concerning learning activities, participants showed a preference for activities they could learn by doing. In what concerns media production related activities, participants revealed low levels of confidence - the majority reported not having ever attempted to create an infographic or a podcast, for instance, and an expressive number of participants revealed they needed help to avoid plagiarism online.

During the sessions, students were allowed to explore the storyworld in an independent manner. To track the students' experience of the storyworld, a hash number was generated and saved on the client side. The majority of the students preferred to explore the motion book sequence and the interactive video. During feedback activities, students exchanged information about the story and tried to map the events of the main character. In these activities, all groups were able to track the main events of the story. Participants also engaged with the storyworld by producing digital artifacts for the blog and through the open-ended quest.

There were several challenges during the development of the activities proposed in the sessions. Often students expected direct guidance from the teacher or researcher to explore the storyworld. The activity related to the blog was time-consuming, and some students struggled with the submission process of their work. It was also necessary to provide additional instructions concerning the search and use of digital resources since the majority of participants were not aware of intellectual property rights. It is important to point out that during the feedback session, students reported having enjoyed this activity since they were allowed to select the post and topic they could reply to.

Outputs of this activity put into evidence that students were able to engage in media production activities, such as the construction of mind maps or digital presentations and well as analyze from a critical standpoint curricular topics such as virtual reality, online safety or the extinction of languages.

Regarding the quest, students engaged in collaborative practices and showed to be focused on completing the mission. All groups completed successfully the activity of filling in a missing person's report putting into evidence they were able to retrieve sufficient information scattered through the provided clues and compile and report their findings. Given time constraints, they were unable to expand the story further.

Feedback provided by the participants regarding the activities they had developed across the sessions was generally positive. The reflection targeted the story and aspects concerning how it was delivered across the platforms. Additionally, participants were asked to reflect upon the relevance and appropriateness of the activities to the development of their communication skills and the enhancement of learning processes within the subject of ESL. Opinions regarding the overall concept of a TL storyworld targeted to ESL seemed to be consensual on the point of being an alternative to the conventional methods used to explore the language - "It's much better than having to work a textbook." In what regards the story, one of the participants suggested that ideally the story should be written with the input of students to be more appropriate and in tune with their interests. Two of the participants mentioned it to be too childish. Explicitly addressing the plot of the interactive video, one of the participants found it to be too predictable. Despite recognizing that it was a work in progress and ultimately the storyworld needed improvement, in particular, technical aspects, they found the storyworld to have the potential to be used as a learning tool for students. When asked what they would do to improve and expand the storyworld, participants suggested the integration of an Instagram account for the main character through which they could track her quests and the creation of a blog through which they could post their adventures. Other suggestions targeted the launch of daily challenges via Snapchat. In what concerns the interactive video, one of the participants suggested to cut down the number of options for exploration but at the same time invest in different endings to the story.

Concerning the exploration of media platforms, participants expressed mixed opinions. In the feedback survey, participants were asked to rate them according to the following criteria - quality, engagement, and learning value. The questions were presented as statements with Likert-type responses. Students could indicate how much they agreed or disagreed with each statement on a scale from one to five (being the highest). Table one presents an overview of the participants' feedback regarding the storyworld's platforms in the first cycle.

**Table 1: Students' feedback concerning the platforms of the storyworld in the 1<sup>st</sup> cycle of implementation**

	Quality	Engagement	Learning
Webisode	3	4	3
Motion Book	4	5	4
Interactive Video	4	4	3
Blog	4	4	4
Qr/Ar Quest	4	4	4

## 4.2 The Mainstream Implementation Cycle

The first cycle of implementation was exploratory and targeted the refinement of CC. As previously mentioned, new spaces of interaction were added to the storyworld, and existent platforms were enhanced after the pilot cycle. In turn, the sessions of the mainstream cycle were targeted to the acquisition of insights regarding the application of the learning sequence - reception, participation and contribution. Despite constituting a fixed set of steps, participants were allowed to explore the storyworld in an unconstrained manner. Resources and activities could point to the specific exploitation of a specific step of the sequence or content in a platform but students were free to explore other platforms to find information and contents elsewhere in the storyworld to complete the tasks. At the beginning of each session, students had access to a guiding document that served the purpose of a to-do list from which they could select and explore planned activities according to their preferences and learning pace.

Taking into account participants' experiences of the storyworld in the first cycle, the mainstream cycle also attempted to address hindrances to the development of activities based on media content production. In order to scaffold the latter, before participants explored the storyworld, they had the opportunity to delve into a set of guidelines regarding selection and reference of online resources as well as examine creative commons licenses by taking a gamified interactive quiz online. A challenge that all groups of participants enjoyed completing and that stimulated competition among peers.

In contrast with the first cycle of implementation, the sessions were developed in two Portuguese secondary schools (school A set in an urban area and school B in a rural one) with 11th-grade students. Despite the fact that CC is targeted originally to the exploitation of topics of the 10th-grade ESL syllabus, the storyworld also allows for the exploration of a more extensive array of topics of interest in ESL and specifically of the interest of 11th-grade students, namely consumerism, branding or the world of work.

Similar to cycle one, it was possible to explore the storyworld with participants of school A and B through a set of three 90-minutes sessions. Nevertheless, due to the juxtaposition of dates to implement the project in the two schools, one group of participants in school B only had the opportunity to experience the storyworld during two sessions. It is also critical to note that School B is not as well equipped in terms of access to technology as school A. The IT Labs are outdated both in terms of hardware

and software, and students do not have access to the WiFi network.

Data collected through the survey targeting the participants' media use preferences indicate that respondents in school A are active members of social networks (83,3%,) and make use of the online world to explore their interests: music (79,2%) and games (66,7%). Unlike the group of respondents of cycle one, in terms of social media platforms preferences, Facebook (70,8%) was ranked in a second position, it was both Instagram and Youtube that were placed at the top of their preferences (91,7%).

More than half reported being in favor of using social media platforms for learning. Similar to the respondents of this survey in the first cycle, respondents prefer to learn by doing (66,6%) and through the discussion of topics (29,1%). Concerning the development of media production activities, respondents reported a high level of confidence in their skills to search for information online (79,1%), and more than half reported feeling somewhat confident on being able to avoid plagiarism online.

In what respects participants of school B, the use of social networking sites is lower than in the case of respondents of school A - 65,4%. In terms of social media platforms, Youtube was at the top of their preferences, 92,3%. Their second favorite is Instagram (73,1%) and Google + the third (69,2%). A platform not referred by respondents of school A. Facebook and Snapchat is a fourth option for these respondents (65,4%). Based on their feedback during sessions, this might be attributed to the use of other platforms such as Viber. In the online world, School B respondents reported liking to play videos and music (88,5%). There are also respondents that reported to like to record videos (19,2%).

In what concerns learning through the use of social media platforms feedback was diversified. While more than half of respondents reported being in favor (26,9% strongly support the use and 26,9% moderately agree), 15,4% strongly disagree with its value for learning, and 30,8% moderately agree with its use in learning environments. 46,1% of the respondents reported liking activities that implied learning by doing. Feedback related to media production activities indicated that they might not be confident media producers. Throughout the sessions in this cycle, participants were working on the tasks at different paces. After verifying that all participants had viewed the webisode, the first receptive step of the session, a brainstorming activity was suggested to the groups. They had to gather information about Cat. This was done via a collaborative tool that creates a word cloud with inputs participants provide. Students' contributions to the word cloud were quite exploratory at this point.

To further tap into the main character's life, the sequent activities were targeted to explore both the Instagram page as well as her Facebook profile. Additionally, students could tap into her mobile phone, through an android system dump from which they could retrieve photos or access her contacts, records of calls and messages. They would take the role of hackers to further tap into Cat's world and at the end provide a report to an intelligence service. Participants' outputs concerning this stage put into evidence that the initial challenge to scaffold students with

strategies of search and selection as well as referencing of digital resources paid off. They were able to appropriately mention their sources. Outputs of this activity also indicate that they were able to track information across platforms, and shape the main character's preferences, for instance, by adding songs to Cat's playlist by relating them to their musical preferences. In terms of language use, what they presented was not complex in terms of discourse but shows that they were able to develop their argumentative skills. They also discussed with peers their options; hence participants were also developing speaking skills such as expressing their opinions.

Even though the students were supported with information in the guiding document on how to use the platforms, basic processes such as copy and transfer of their work to another format was confusing for them. This indicated that not all the participants had the necessary digital skills to complete the tasks.

During this session, it was possible to observe that groups used different strategies to tackle the tasks. Some groups took a considerable amount of time discussing their criteria to add resources to Cat's device, while other groups distributed chores among members to retrieve information from different platforms. While completing the tasks, they were using the language and exploring subject matter, for example, data protection. This is visible in one of the comments of one of the participants that was exploring the android system dump - "I didn't know that we could extract so many things out of a mobile."

Sessions two and three of this cycle followed the same structure of moving from learning inputs to outputs. But the technical problems with computers often crashing in school B and different rhythms on the development of activities on the part of participants in school A, did not allow for an in-depth analysis of the blog as it had happened during cycle one. Learning artifacts of this cycle were poor in terms of complexity. This does not necessarily imply that they wouldn't be able to produce digital artifacts for the storyworld of more complex matter. The fact is that the 90 minutes of the sessions were not enough to plan and structure more complex artifacts. This was visible through the observation of one of the groups in school A that was developing a script to shoot a video when the school bell rang.

Participants' media artifacts or plots regarding the expansion of the quest, as was the case in cycle one, reveal that they bring the story to their real-life contexts or relate them to pop culture aspects of their interest. For instance, in a slides presentation, a group of students created a story around NASA, aliens and Star Wars developing a conspiracy theory about Cat knowing too much about alien life forms. Other participants may have been inspired on the Latin American scenario where the guardian was last seen and related it to series they were watching such as *Narcos* or *Queen of the South* by placing Cat or Megan (the guardian) at the center of the drug trafficking world.

Despite the lack of time to further develop their stories, participants who were able to complete the quest engaged in the exploration of their storytelling skills. Some media artifacts show a higher level of complexity than others, but even struggling students were able to develop skills related to media production.

An explanatory example is the fact that some participants enjoyed the use of online bulletin boards to gather information. They used them to create informative posters regarding Megan's disappearance both with the information they had collected through the AR and QR clues and with information on how to help authorities find missing people, they had searched online.

In general, participants in this cycle provided feedback that indicates lower levels of engagement and satisfaction with the platforms of the storyworld in comparison to participants of cycle one. Overall feedback regarding the learning input platforms was low. Moreover, in school A, respondent's feedback indicated that for more than 30 % of students the experience was negative or they were not sure about whether or not these platforms were a good fit for the storyworld. Feedback regarding the learning layer of storyworld, indicated that respondents in general in both schools regarded CC as a useful tool to learn English, but contrary to feedback provided by respondents of cycle one, there were a significant number of students that expressed feeling undecided regarding the educational value of the experience. In school B, some respondents strongly disagreed with the value this experience might have for the development of learning activities.

In addition to the surveys, students and teachers of each group of participants provided their insights regarding the storyworld. The interviews targeted their experiences of it and what aspects could potentially improve the experience of CC.

One of the students of school A, a regular player of video games, was able to provide a fully gamified scenario to expand CC. In his opinion, the experience could be developed as a game across continents. Portal pieces would be scattered across the planet, and participants of the experience would need other participants to help to solve clues and challenges to retrieve the pieces.

School A participants' in this cycle did not provide as many comments to enhance the storyworld, but one stood out "I liked that we could write the story on our own." A comment that is echoed in the feedback given by a participant in school B. This student proposed that students could create CC from scratch. Students could develop the story progressively according to what each group, week by week, would write in terms of plot. This student, in particular, liked to read comic books and was a fan of old Spiderman editions. One might wonder if the fact that the student who was passionate about video games and the other who was into comic books had scaffolded their critical perspective regarding the world building aspects of CC.

The teacher in school A, a participant in both the cycles, indicated that the group of the second cycle was at certain points of the sessions somewhat confused. She also confirmed, taking into account both cycles of implementation, that the storyworld could be used to enhance students' use of the language but that the exploration of it should be refined. She particularly enjoyed the experience as a different way to explore the English language with her students and was receptive to the development of pedagogical practices that she might not be used to explore in her classes.

Feedback from teachers of school B indicates that they have a positive perception of the experience of CC. One of the teachers

suggested that Cat's quests could be targeted to explore other English speaking countries as a way to put students into contact with a more diversified set of contexts in which the English language is used. Teachers of this school also highlighted the need to learn more about how to explore this type of experiences; they expressed that they would not be able to run CC with their students by themselves. On the same note, one of the students in school A referred that teachers should invest more in the development of this type of experiences and on their professional development to update their pedagogical proposals - "Teachers should not expect to use in the present the same methods that they used at the time when they started their career."

### 4.3 The exploration of CC in a Greek ESL Learning Environment

Despite the fact that the storyworld was designed and targeted to meet the needs of 10th-grade students in Portuguese formal learning environments, CC was also explored in a different learning context, and by students of a different age group than the users CC initially targets.

Further tapping into the application of transmedia storyworlds in formal learning environments, CC was used as a research instrument to provide insights on the use of transmedia storytelling in a Greek formal learning environment. According to the researcher and teacher, CC presented the potential to be aligned with the Greek curriculum goals for 6th-grade students and to be adapted to meet these students' needs. In order to explore the impact of the use of transmedia resources in an ESL classroom, the researcher used two groups of 6th-grade students of a public school in Athens. Both groups had access to the story and contents provided in the different platforms of the storyworld, but while one group was allowed to explore the storyworld in its original format, a control group of students explored the contents of CC in a text-based format through reading and writing activities. The exploration of the storyworld was adapted in both groups taking into account that some of the contents presented in the storyworld were of considerable complexity for the students.

Students completed a pre-test targeting specific learning goals (people and locations description) within the Greek ESL syllabus before starting the experience and were asked at the end of it to take a post-test covering the same goals. They were also given a reading comprehension test after the presentation of the story to assess the level of comprehension of the story. Based on students' scores on the pre- and post-tests, the researcher observed there was an increase in students' performance in both groups. The group that had explored the transmedial version of the storyworld, however, presented higher levels of performance in the test when compared to the control group. The difference in scores in the comprehension test was also statistically significant, indicating that the experimental group understood the story better. The researcher also noted that students that often displayed disruptive behavior displayed higher levels of engagement and participation when they were exploring CC.

The digital artifacts created by the students indicate that they were deeply engaged with the content provided in the platforms

and could relate information spread across the storyworld to acquire a broader perspective of the story. They were also able to create extensions to the story through the open-ended quest. Similar to the strategy used in CC, their stories revolve around mysterious events to develop the plot, or through the information that Cat's friend provides her. Besides developing their media production skills, they were able to adapt and repurpose the plot and structure of the interactive video to create their extensions of the story. In their stories, the characters visit central locations, go to museums in different parts of the world to find portal pieces, They also make use of their cultural references to develop their adventures; for instance, they fly Cat from Bolivia where she was looking for guardian and place her at the Parthenon gallery to look for a portal piece.

Below are examples of learning artifacts created by students across the two cycles of implementation and by students in Greece.



**Figure 2: Screenshots of digital artifacts created by participants of the first; second cycle of implementation and by students in Greece to expand the storyworld**

#### 4.4 Insights on the Learning Experiences Emerging from the Exploration of the Storyworld

Putting the two cycles of implementation into perspective and considering the experiences based on the storyworld in Greece, it is possible to indicate that CC presents the potential to engage

students in the exploration of language acquisition processes and ESL subject matter.

The rigid time frame of 90 minutes did not encourage participants or allowed them to explore, develop, or create media artifacts of higher complexity. It is important to note that despite the scarcity of learning artifacts collected across the cycles, it was possible to identify that participants had made use of transmedia skills in this case in terms of navigation across platforms to build their own experiences within the storyworld.

Taking into consideration how students developed the activities proposed to expand the storyworld it is possible to assume that if they were given more time, they would be able to create more vibrant and more complex extensions. It would be necessary to have a longer cycle of implementation across the school year constituted by more sessions to further tap into this matter.

Context also determined the success of the development of the proposed activities. In school B, students did not have access to a well-equipped IT lab. During the sessions, participants had to restart activities or spend more time to complete them due to technical problems.

Feedback from participants across the two implementation cycles was not always positive. Possibly, different contexts, participants diversified use of media platforms, and a mixed set of preferences ultimately translated into a diversified range of experiences of the storyworld.

The common denominator of these learning experiences may be the fact that through CC, participants were able to develop their storytelling skills, express their creativity and connect their real-life experiences to Cat's experiences while exploring content and making use of the target language.

Lastly, as important as the experience of the storyworld were activities that had to be designed to scaffold a better engagement with it. Some participants refer that the experience of CC was positive because they had learned how to use creative commons licenses, for instance.

### 5 Taking Stock and Moving Forward

The documentation of the application of this storyworld was limited in scope and in time. Nevertheless, based on the participants' experiences of storyworld across the two cycles of implementation, it was possible to outline a set of guidelines that might be considered in the design and application of TL environments and experiences in educational arenas.

First and perhaps the most obvious observation is the need to take into account students' contexts, social and cultural references, media use preferences to promote engagement with the story and its content. The more participants were able to take hold of the story, the more engaged they were in the development of the learning activities provided. In other words, students need to own the narrative or even move beyond the role of co-creators to the role of narrative designers, as some of the participants suggested during the feedback activities.

Second, activities developed within the context of the storyworld must be scaffolded. This means that the teacher should beforehand identify possible knowledge gaps that students may

have that may hamper their experience of and contribution to the storyworld. Participants in the two cycles showed different levels of proficiency in what regards media literacy skills or digital skills. It is necessary to debunk the myth that all students are “digital natives” and cater to the different needs of students.

Third, ideally, students should be allowed to engage with the storyworld for extended periods of time. This implies that students should be given a sufficient amount of time to explore learning input platforms and significantly more time to use the learning output platforms to be able to provide a contribution to the storyworld. Moving to an active, productive role of enacting knowledge requires planning, critical thinking and often the engagement in collaborative practices - processes that cannot and should not be restricted by rigid time frames.

Fourth, the TL experience should be developed across time so that students have the chance to design their strategies of tackling challenges within the storyworld. Participants of the two cycles were not familiarised with the working methods this approach entailed and seemed to be more confident and comfortable during the last sessions indicating that first they needed to understand their role within the storyworld (explorers and world builders) and then develop strategies to perform it.

Fifth, the experience of the TL storyworld should not be fragmented or targeted solely to the exploration of a given platform. Students should be allowed to navigate across content and platforms in a relatively unconstricted way, meaning that the goal of an activity may be the exploration of a specific topic or platform within the storyworld, but students can resort to other spaces within the storyworld or outside to gather information, resources and means to a complete a given task.

This exploratory DBR study sought to dig into learning experiences stemming from students' engagement with a TL storyworld within ESL formal learning contexts. Despite being experimental, outputs of the two cycles of the implementation of the storyworld suggest that the strategic use of processes of participation, co-creation, and expansion of a transmedia storyworld, as well as, the design of activities based on the students' media use and academic needs may enhance the exploration of language acquisition processes in a social and culturally contextualized environment. Stepping aside from traditional approaches to language learning based on the abstract representation of the language, TL storyworlds, such as CC, provide students opportunities to express themselves verbally and nonverbally and to engage in a diversified range of creative tasks in a media ecosystem.

The establishment of a design framework for TL experiences is thus of the interest of educators. Future work in the field should point in this direction; nevertheless, it should be grounded in the analysis and comparison of TL experiences and not solely on theoretical work. It is hence critical to promote the creation of TL experiences and their exploration in different learning scenarios to create a knowledge base.

Taking into consideration teachers' feedback on the experience of CC, it becomes evident that educators are receptive to the redefinition of their role from instructors to mediators of

experiences in the classroom. Notwithstanding, they do not feel equipped with the necessary skills to take part in this type of immersive learning environments. How to further support the mediators of participatory learning ecosystems should then be accounted for in the development of the field of transmedia education.

The focus should not only be on the development of media-enhanced learning scenarios but also on the sones, who use them, shape them, and build them.

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