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Gamification of Authoring Interactive E-Books for Children: The Q-Tales Ecosystem

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GAMIFICATION OF AUTHORIZING INTERACTIVE E-BOOKS FOR CHILDREN: THE Q-TALES ECOSYSTEM

Completed Research

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Abstract

The e-book industry is reshaping the norm of traditional book publishing and most publishing houses are concentrating their efforts in digital, in order to satisfy new market needs and capture significant market share. Currently, one of out of five e-books sold, are children-related and overall, the e-book industry is projected to be valued at \$18.9 billion by 2018. Nevertheless, the increased market penetration of independent writers accompanied with continuous technological improvements leads to new challenges for the stakeholders involved, as a growing number of individuals with limited resources attempt to compete against traditional publishing houses. The Q-Tales ecosystem aims to support the community of creative professionals, experts and parents co-create new (or transform existing) children literature into high quality interactive e-books.

At this new disruptive approach of self-publishing, the gamification paradigm was employed, creating game-like experiences, to motivate professionals participate in the process and adopt it. The present study focuses on the gamification aspect of Q-Tales as means to drive engagement with the entire ecosystem and promote its appropriate use, enhancing the overall goal of creating interactive children e-books. The gamification design of the Q-Tales distributed system for collaborative authoring of interactive e-books for children is presented and discussed as a case study of gamification of electronic services. More specifically, game elements, such as points, leaderboards, badges, missions and feedback were infused in the architectural units of the platform, in correspondence to the overall development of the Q-Tales Gamification Framework.

Keywords: Gamification, Gamified Services, Collaborative Authoring, Interactive children e-books

1 Introduction

The children book industry is continually evolving and even the very definition of “e-book” is being pushed to new levels. Overall, an e-book is the digital snapshot of a book, enhanced with multimedia and interactive features that disrupt the linear storytelling process (Müller et al., 2015). The enriched non-linear progression comprises of pop-up assets, audio files, illustrations, avatars, hyperlinks and mini games, which are embedded in the end product. As such, the production of high quality children e-books requires collaboration between a plethora of professionals (e.g. developers, graphic designers, 3D illustrators, voice actors, editors, curators and authors) (King, 2010).

The e-book industry is projected to grow from \$8.4 billion in 2013 to \$18.9 billion in 2018 (Statica Report, 2016). A segment of high potential is the one of Children e-books as in 2014 one out of five e-books purchased were children-related (Nowell, 2015). Nevertheless, recent studies on market trends indicate that the traditional publishing method is changing (Author Earnings Report, 2016). More specifically, independent authors, who write and publish books outside of the scope of publishing houses, are overtaking the Big Five houses and other means of publishing such as Amazon. During the past two years, independent writers’ market share increased from 27% to 43%, while the Big Five dropped from 39% to 24%. Subsequently, independent writers are forced to identify alternative publishing routes, most of them being the individual approach, as the process from script submission and authoring to publishing via publishing houses may take up to two years. By removing the time consuming practice and the publisher’s margins, they also manage to become cost effective. However, they are faced with a serious challenge, due to skill and technological limitations. For example, how to continue competing against publishing houses with unlimited resources and know-how. Such a market need creates the opportunity to develop collaboration ecosystems, in which individuals share the entirety of assets, knowledge and expertise to publish e-books and are constantly monitored by feedback loops to ensure the highest standards possible.

Q-Tales is a collaboration ecosystem where creative professionals, experts and parents co-create new (or transform existing) children literature into high quality interactive e-books. In order to achieve that, the Q-Tales Collaboration Platform brings together the aforementioned stakeholders and subsequently through the Q-Tales Authoring tool the interactive e-books are co-produced. Following that, the Curation Framework ensures that every produced interactive e-book conforms to the academic developments of pedagogy. Lastly, the Q-Tales interactive e-books are made available through the Q-Tales store for parents to purchase for their children to read. This novel approach in the process of self-publishing extends the currently available options and enables creative professionals in the industry to become involved throughout the lifecycle of the process of new interactive e-books for children creation and publishing.

As this new approach of self-publishing is disruptive in the very nature of current publishing practices and approaches, in order to motivate professionals to participate and adopt it, the gamification paradigm was employed, turning the Q-Tales ecosystem and respective processes into game-like experiences. In the present study we focus on the gamification aspect of Q-Tales as means to drive engagement with the entire ecosystem and promote its appropriate use, based on the overall goal of creating interactive e-books for children with pedagogical value. In the field of gamification this application presents a great interest, as to the best of our knowledge no current gamification applications in the field exists with the aim to support the publishing process at such European scale.

The rest of the paper proceeds as follows: in Chapter two we present a review of Gamification and respective game elements in the developed gamified service of Q-Tales. Following, is a brief presentation of the overall ecosystem architecture and a detailed description of the Gamification application of Q-Tales. We conclude with the discussion on the challenges and future developments.

2 Background on Gamification

Gamification of electronic services has in the past six years received the attention of both the industry as well as the academia as means to transforming different services into a game-like experience for the participating end-users. Although a widely adopted definition is yet to be produced, the most inclusive definition to date stems from Deterding et al. (2011b) who define Gamification as “...the use of design elements characteristics for games in non-game context”.

The gamification paradigm has been applied into different non-game context such as Health (Hamari and Koivisto,2013; Hori et al.,2013;), Education (Cheong et al.,2013; Denny,2013; Dong et al.,2012; Fitz-Walter et al.,2011; Li et al., 2012), Commerce and Marketing (Hamari and Jarvinen,2011; Hamari,2013) with different goals such as engage participants (Szegletes et al.,2015; Burke, 2011), motivate behavioural and psychological outcomes (Deterding et al., 2011a; Huotari and Hamari, 2012) and promote social interactions (Hamari, 2013; Hamari and Koivisto, 2013) amongst others. In order for a new or existing service to be enhanced with playful affordances and receive the benefits that derive from applying the gamification paradigm, a set of game elements are extant and can be utilized to create the set of rules that will guide the user within the game space. The basic game elements available for introduction in a new gamified service include: Points, Badges, Levels/Status, Leaderboards, Rewards, Missions, Challenges and Gamification Feedback, presented in Table 1.

Game Element	Description	References
Points / Point Structures	Arithmetic units used to keep track of each end-user’s score as a result of success in a predefined and specific task. Participants can earn points through conducting activities that are available in the gamified process. Subcategories of points include: Experience points – XP that are obtained continuously, Redeemable points - RP that are of the type of “earn and burn” for external rewards, Karma points - KP that are awarded from a player to another.	Kuo and Chuang, 2016; de Rocha Seixas et al., 2016; Cheong et al., 2013; Eickhoff et al., 2012; Thom et al.,2012; Farzan et al., 2008b
Badges	Badges are visual representations of achievements in the gamified structure. They can serve as an indicator of accomplishment from the system to the participant as well as a representation of status from participant to participant.	Davis and Singh, 2015; Hamari, 2015; Antin and Churchill, 2011
Levels / Status	Levels are predefined sets of bundled actions that are of different difficulty to be completed (usually progressive upwards in difficulty) and Status can be obtained upon progressing and completing each Level. Through the employment of levels, the gamified structure can guide the evolution of skill and mastery of the participants in order to enable them to experience optimal challenge.	Mutter and Kundisch, 2014; Dominiques et al., 2013; Dong et al. 2012; Farzan et al., 2008a
Leaderboards	An ordered list of the current ranking of participants. The formation of the leaderboard can be in various forms dependent on the case: (a) infinite leaderboard with all participants being visible, (b) a non-disincentive leaderboard where each player can see his/her relevant position in the center and 1-3 users predating him/her and 1-3 following him/her. (c) Slice&Dice leaderboards where the leaderboard is sliced based on contextual factors such as location, social etc.	de Rocha Seixas et al., 2016; Hanus and Fox, 2015; Landers et al., 2015; Butler, 2013
Missions / Challenges / Quests	Challenges and Missions enable the players to go through a structured and self-contained set of tasks and training content. They can be embedded within levels to micro-manage skill evolution of the player. Both can be used to ensure parallelism to the user goal at hand and constitute small steps that build up to the bigger goal of the gamification setup.	de Rocha Seixas et al., 2016; Zichermann and Cunningham, 2011
Rewards /	In all gamification frameworks there are various reward structures	Lounis et al., 2013; Li

Achievements	that enable the participants to be rewarded for their actions. Two main categories of reward are Virtual and Physical based on the point of application. Virtual rewards are stemming and contained within the game space. Physical rewards transcend to the real world. A badge is an example of a virtual reward where monetary rewards are physical rewards.	et al., 2012; Fitz-Walter et al., 2011; Liu et al., 2011; Montola et al., 2009
Gamification Feedback	In a gamification setting feedback on all actions is considered important. Additionally to the general feedback mechanisms, that keep the user on the predefined path, the granular display of current stand and upcoming actions until completion enables engagement with the content. The application can be in the form of a progress bar within Quests, Challenges etc. or an overall goal progress Bar	Xu, 2015; Dong et al. 2012; Li et al., 2012; Richter and Raban, 2012; Gustafsson et al., 2010

Table 1. Base Game-elements eligible for introduction in a Gamified Service

The aforementioned constitute a set of core game elements that can be found in gamification solutions. These game elements however have not been examined, to the best of the authors' knowledge, for their effect in a solution in the industry of Q-Tales, leading to a theoretical gap in the effect of their application. In order for the game elements to be introduced into a new system a game design framework can constitute the theoretical framework upon which the design and development can be based. In gamification, a top level and widely adopted framework is the MDA Framework by Hunike et al. (2004). The MDA stands for Mechanics, Dynamics and Aesthetics and it is a game design Framework that consists of three levels of abstraction that support the design of a game based (a) on the available game components eligible for introduction in the game and (b) the potential dynamic interaction of the players to the components and the results from the player side, in contrast to the (c) expected results from the designer side. In the MDA Framework, as defined by Hunike et al. (2004), Mechanics are "the particular components of the game, at the level of data representation and algorithms", Dynamics constitute "the run-time behaviour of the mechanics acting on player inputs and each other's outputs over time" and Aesthetics is the "desirable emotional responses evoked in the player", when he/she interacts with the game system as illustrated in Figure 1.

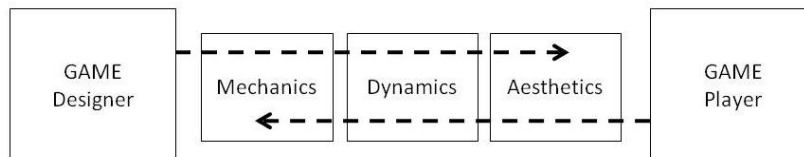


Figure 1. The Mechanics – Dynamics – Aesthetics (MDA) Framework (Hunike et al 2004).

An example to better understand the examination of a game element under the lens of the MDA Framework would be to have an achievement virtually represented by a badge. Once the end-user accomplishes the achievement, then the badge is awarded by the system to the end-user. This is performed in order for the participant to experience a sense of accomplishment by the end result of his/her effort. As such the MDA Framework can work as a theoretical lens under which the gamification design decisions are performed.

2.1 The Q-Tales Service and Architecture

2.1.1 The Q-Tales Project

Q-Tales is a collaboration ecosystem designed to serve the needs of the European Children e-book industry, where European Creative SMEs, Experts and Parents, co-create new, or transform extant children literature, into high quality e-books and interactive apps using innovative ICT solutions provided by European ICT SMEs along with a curation framework provided by European academic ex-

perts in the field of Pedagogy. Following an iterative process of user requirements that guided the creation of the ecosystem with the modules and respective features, the designed and developed Q-Tales ecosystem consists of the following components:

- The Collaboration Platform in which the projects are created and managed
- The embedded or stand-alone Authoring tool in which the actual process of e-book authoring takes place in a collaborative manner
- The Q-Tales store in which the completed projects are published and sold and lastly
- The Q-Tales player used by parents to access the purchased interactive e-books.

All modules are interconnected and comprise the Q-Tales ecosystem. The Q-Tales’ ecosystem overall architecture and ontology are illustrated in Figure 2 and Figure 3 respectively.

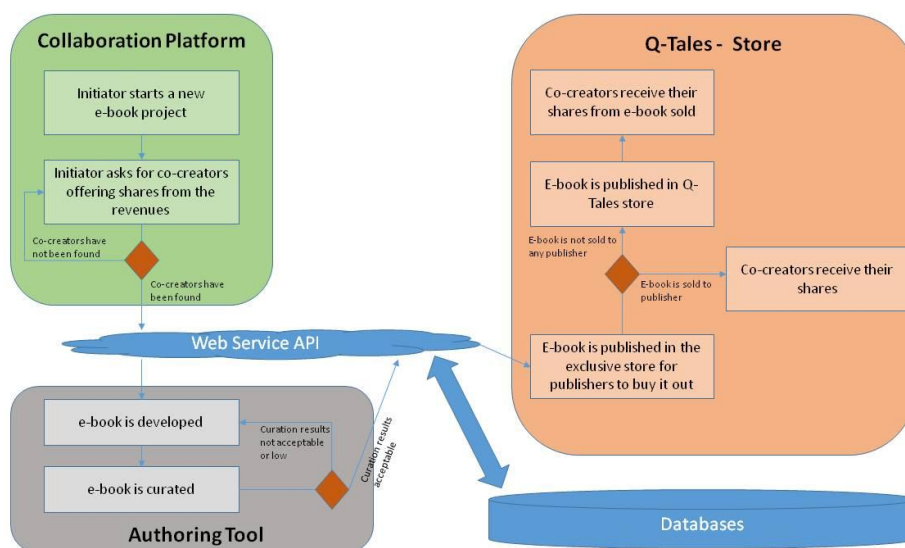


Figure 2. Q-Tales Architecture

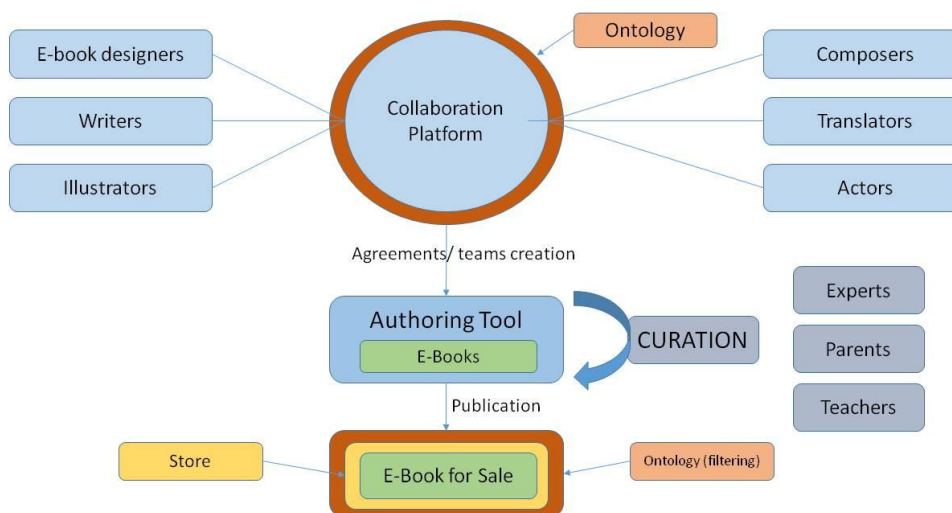


Figure 3. Q-Tales ontology

2.1.2 Q-Tales Modules

The Collaboration Platform component is responsible for the professionals' communication and project management from initiation to publishing of a finished interactive e-book. The back-end system consists of Web Services in JAVA using the Spring framework to provide MVC architecture. Connections with databases are managed by the Hibernate Framework acting as middleware and the View part of the Back-end is in XML format. The Front-end is built on Joomla CMS with the dashboard utilized in HTML, PHP and JS using jQuery for the communication via the Web Services. The Collaboration Platform is presented in Figure 4a. The Q-Tales store component (Figure 4b) is build using PrestaShop as it is compatible with the Joomla Content Management System used by the Collaboration platform.

The Q-Tales Authoring Tool is based on the Unity 3D game engine to provide the respective tools for the authoring of interactive e-books (e.g. animations, text, images, 3D assets etc.) The integration with the remaining modules is conducted through Web Services and the editor is built using C# on mono develop. Lastly, communication with the data layer takes place through web services (www.qtales.com/api). The authoring tool is presented in Figure 5a. Completing the ecosystem, the player of Q-Tales is also build in Unity3D enabling the playback of purchased interactive e-books. Compatible players are deployed in iOS, Android, Windows, MacOS and also in WebGL and function as a shell within which the purchased e-books are displayed as seen on Figure 5b.

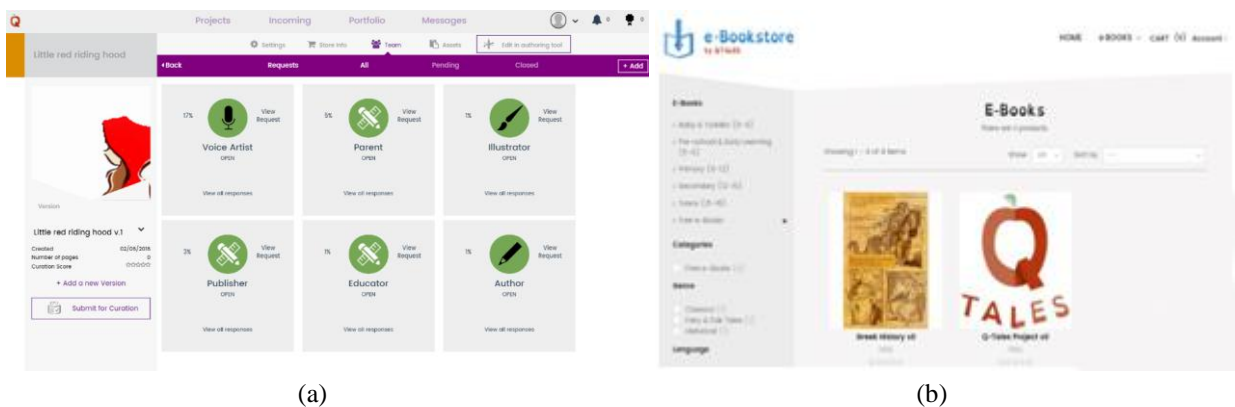


Figure 4. (a) Collaboration Platform, (b) Store

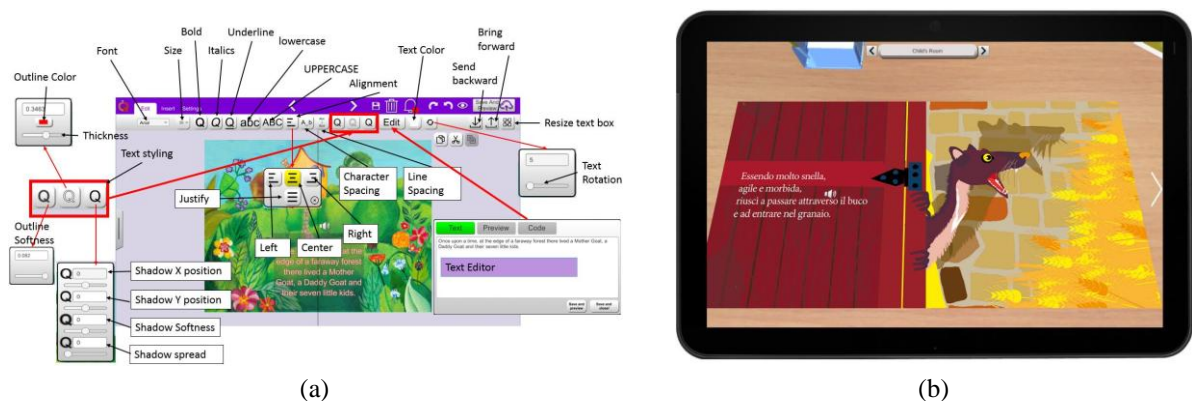


Figure 5. (a) Authoring Tool, (b) Player with a developed interactive e-book

3 The Q-Tales Gamification Architecture

Under the Gamification paradigm, the aforementioned distinct modules that address different stakeholders in the process of interactive e-book authoring constitute the non-game contexts that are infused with game elements to provide gameful affordances to the respective users, guided by the Q-Tales Gamification Framework. The gamified system we designed was intended to be used by a number of different professionals and individuals in the spectrum of interactive e-books for children including Educators/Teachers, Parents/Children, Authors/illustrators/Narrators among others.

The choice to introduce and apply gamification was a result of the two major workshops conducted in Italy (Rome) and Poland (Cracow) where stakeholders from all user groups relevant to Q-Tales' scope participated in the design process that resulted in the extraction of the platform and gamification goals, as well as guidelines for the game elements eligible for introduction in the Q-Tales ecosystem's modules. More specifically, the workshop held in Rome, Italy, involved 18 participants including 7 educators, 2 parents' organizations, 3 researchers, 3 technology developers, 2 pedagogists and 1 bookseller and was focused on the platform itself. Stakeholders were asked to identify potential barriers from their perspective to the realization of the Q-Tales platform and of e-books generation, which then were incorporated in the gamification design of the platform. For instance, a main issue identified was the "Need to encourage creators, producers, publishers, schools to continue to use the platform", which should be resolved by the introduction of game elements, such as missions, badges and leaderboards.

Furthermore, the workshop held in Cracow, Poland by the Cracow Chamber of Commerce and Industry had the form of a focus group, in which participants focused on the barriers to children's literacy development. In total, 12 participants from a variety of backgrounds including educators, reading specialists, authors and publishers were asked in a focus group context to openly discuss potential implementation barriers. The main results related to gamification were:

- Experts agreed that achievements gained by profile/avatar could motivate to reading
- Children should be rewarded for trying, not just for success
- Introduction of mini games with make the reading process more interactive and engaging

The aforementioned outcomes guided towards the identification of possible gamification goals that are presented in Table 2 for the Q-Tales stakeholders.

Architectural Unit	Gamification Goals
Collaboration Platform	For Professionals: To enhance registrations, participation, initiation / completion of projects, identification of experts, contribution of content, communication during production and general exchange of services.
Authoring Tool	For Professionals: To ensure appropriate use of the tool, to educate users in its use, to enhance participation and to assist in the process of the production being in parallel with the pedagogical guidelines.
Store	For Customers / Parents: To enhance dissemination of the produced e-books, reviews and potentially drive sales.
Interactive e-books	For Parents / Children: To increase engagement with the e-book.

Table 2. Gamification Goals for different stakeholders in non-game contexts of Q-Tales e-book authoring / selling / reading.

The Q-Tales business gamification goals were introduced within the Gamification framework where the game elements (both Core and Component Specific) facilitate their attainment. The Q-Tales Gamification Framework in-turn works as a guideline and a representation for the taxonomy of game elements as well as a conceptual approach to the definition of game elements and the respective mechan-

ics, dynamics and aesthetics built in the gamification of the various Components of the specific ecosystem. The Q-Tales Gamification Framework is presented in Figure 6.

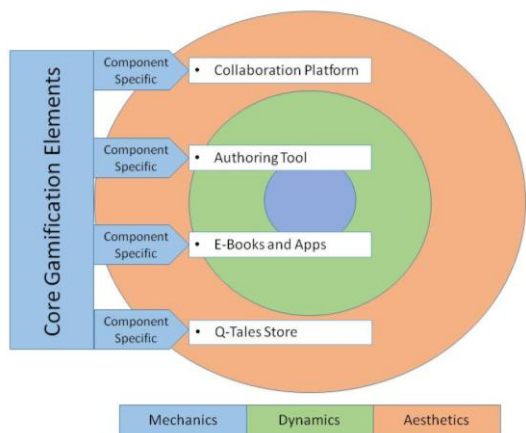


Figure 6. Q-Tales Gamification Framework

The building blocks represent the intersect of the game elements of the Q-Tales ecosystem with the reason for introduction in the ecosystem as derived from the user research in connection with extant literature and business best practices. The basis of the gamification constitutes the Core Gamification Elements. These elements are transparent to the entire ecosystem and are applicable horizontally.

An example of this type of game element is the Point. Across the Q-Tales ecosystem points are awarded to the users in all the components in order to enable tracking of progression (among others). Complementary to the core game elements are the Component Specific game elements.

These game elements are vertical and cater to the specific needs/goals of the users in different stakeholder groups. An example of such a game element (Component Specific) is the Mission/Achievement game element that is not – universally applicable (i.e only Authors have missions to complete). A combinatory example under the MDA framework lens would be that the Author is awarded points (core) for initiating a new book in the Collaboration Platform and then gets into the Mission (component specific) of creating an interactive children e-book specific for the ages of 0-4 and of ‘Fairytale and fantasy’ genre. Both types address the Authoring tool and are introduced to drive the author to start engaging with the New Project Creation and reward him/her upon successful completion.

In Q-Tales, the main game element that is extant is the “Point” and in particular Experience Points and Karma Points. Points are utilized throughout the ecosystem to enable the stakeholders to track and showcase their performance in terms of system use and e-book creation results. Overall, the point structure follows different formations for each group of end-users as derived from the available functionalities of the systems they employ and have access to. In Q-Tales there are 31 point-awarding actions distributed among the different components and available to respective end-users as illustrated in Table 3. The relative weight of each action and subsequent experience points awarding stems from (a) its importance to the ecosystem and (b) difficulty to be completed, as identified by the involved stakeholders of the platform and the end-users in parallel to Gamification best practices and academic literature.

Q-Tales Subsystem	Point awarding actions
Collaboration Platform	Sign Up, Profile completion / e-mail confirmation, Submission of rating for a professional collaborator, Professional addition to favourites list, Open access content upload, New project initiation, Completion of onboarding with guidelines for pedagogy, Issue a request for collaboration in a new project, Securing a collaboration towards materializing a new project, New asset (Illustration/3D model etc.) upload to ongoing project, interactive e-book completion, Curation score reception and result, Publishing an interactive e-book for all age ranges/ all genres / in all EU languages / catering to special needs and Collaboration Karma Points (awarded from professional to professional) as well as submitting a curation for Expert curators

Authoring Tool	Authoring Tool features utilization in interactive e-book, Pedagogical mini-game introduction, Curators' evaluation submission
Store	Authors (Selling an e-book, Receiving a rating). Customers/Parents (e-book purchase, Rating submission, Review Submission, Social media share, Affiliate sale)

Table 3. Point awarding structure in Q-Tales ecosystem

Complementing the point system and in the process of selecting the best possible professional to collaborate, the Q-Tales ecosystem includes the game element of leaderboard that indicates the ranking of each professional involved in completed interactive e-books. The leaderboard is based on a multitude of Slice and Dices. Each slice and dice is conducted via a series of filters that enables the presentation of ranking of each user in the following categories:

- Location Slice and Dice: Ranking by Country of Professional
- Profession Slice and Dice: Ranking by professional group (eg. Illustrators' Leaderboard)
- Story Type: Ranking by genre specific published books (e.g. Fantasy e-books Leaderboard).
- Age Group: Ranking by published books on specific age ranges (e.g. 0-4 Years Old Leaderboard)
- Curation Score: Ranking by Curation Scores of published books.

Overall, the leaderboard is an 8-place ranking list that presents the absolute position of each professional in the first column, followed by his/her username in the ecosystem and lastly in the third column the absolute number of points accumulated. The first 5 rows are reserved for the Top-5 professionals and the following is the three-slot non-disincentive leaderboard. In the last 3-rows the logged-in professional is always in the middle (Row #7) and preceded by the previous users (in points) and followed (Row #8) by the user having the next position. Figure 7 illustrates the Q-Tales Leaderboard Format.

Location		Curation Score
Profession	Stories	Age Group
Rank	Username	Points
1.	TopScoringUser	1.244.131
2.	2ndUser	1.124.424
3.	3rdUser	980.000
4.	4thUser	875.000
5.	5thUser	658.839
RankOfUser - 1	xxxxUserName	580.414
RankOfUser	LOGGED IN User	580.300
RankOfUser +1	yyyyUserName	580.230

Figure 7. The Q-Tales Leaderboard

In the case that the logged-in user is in the Top-5, the three final rows (Figure 7: Row #6, Row #7 and Row #8) disappear from the leaderboard page. The leaderboard formation was selected to cater both to the needs of new comers as well as established professionals in the Q-Tales platform.

In addition of the continuum and cumulative nature of a leaderboard in terms of end-user performance in the context of Q-Tales and to further drive participants to engage with the system, a series of achievement milestones is introduced in the gamification structure.

These achievements are represented with the use of badges, awarded in perpetuity to end-users upon completion of specific tasks related to milestones and the user group. Overall, 88 different achievements were identified and badges were designed to represent them. In order to enable the end-users to achieve higher levels of status based on their achievement the badges have three different levels (White, Silver, Gold) representing different importance and difficulty of achievements. Indicative badges are illustrated in Figure 8.



Figure 8. Indicative badges of Q-Tales (a) Different Levels and (b) Badge assortment for professionals, curators and readers of interactive e-books

Overall, the end-users have the ability to select for each badge whether it will be visible to the remaining professionals of the platform as means to present their current status and achievements towards securing new collaborations on upcoming projects.

Another game element introduced in the Q-Tales ecosystem, is the game element of missions. Missions are utilized in terms of the formation of specific challenges for the creation of different types of books. As the Ecosystem progresses and interactive apps and stories are created, missions will drive the creation of various stories that are required to complement the categories in the Q-Tales store. Initially, a set of Missions is introduced with the same constant reward (in terms of points) throughout and based on the progression of book creation, different missions will be constantly introduced to balance the overall need for different types, story genres, story characters etc. The set of initially introduced missions consists of 62 different missions all awarding 1000 Experience Points. The user is awarded the points if he/she has begun a new project through a mission and has successfully passed all the stages up to publishing.

Lastly, for every action that triggers an awarding rule (for points/badges etc.) within the gamification framework, feedback is given to the user on the in-gamification result of his/her action. That is conducted by a popup that enables him/her to understand and follow his/her actions and the respective gamification reaction and reward. Additionally, the end-user is given access to his/her gamification history where in reverse chronological order all rewards/achievements etc. are presented. This enables the user, in a non-intrusive or work-disruptive way to be informed on what is currently achieved and which is the next milestone throughout the process.

Overall the Q-Tales Gamification Framework enables the application of a basic set of game-elements to the Q-Tales ecosystem as derived by the end-user requests in conjunction with publishing best practices and extant gamification literature.

4 Conclusions, Limitations and Future Work

The Q-Tales ecosystem comprising of an Authoring tool, a Collaboration platform, a Store and a player has the aim to transform the way interactive e-books for children are developed and distributed. Gamification was introduced to enhance and expedite that process leading to the creation of a new stream of valuable interactive e-books for children to experience.

The Q-Tales current gamification application stems from a combination of results from end-users' research coupled with the extant literature and gamification best practices in relevant fields to the contexts of Q-Tales. A set of base game elements (points, badges, leaderboards, missions and feedback) that cater to the need of enhanced engagement of end-users with the Q-Tales ecosystem were in-turn identified and introduced in the Q-Tales ecosystem's modules. The system is currently fully developed and will be operational in closed beta in the upcoming months. In order to evaluate the system and the Gamification Framework overall, the closed beta will run in four countries (United Kingdom, Italy, Poland and Greece) with one hundred participants per country. The evaluation will be conducted with criteria pertaining to the validity, utility, quality and efficacy of the system as derived from the literature (Gregor and Herver, 2013)

The Q-Tales gamification, as all gamified applications faces a number of challenges. An important challenge is that of prolonged and sustained engagement. In order to mitigate a potential issue of people becoming overall disengaged with Q-Tales, different short-, mid- and long-term goals have been introduced to cater to all the stages of e-book creation. However, in the long run, as people become familiar with the system the initial effect of gamification-driven incentives may wear down. An approach to address this is to continuously update the missions' lists, rewards structures and professional badges assortment and introduce new goal structures for people to engage with.

Another challenge is the need for fine-tuning and aligning the incentives given for different user groups. Currently the rewards are universal for each user group, regardless of the inherent differences within each group. A solution towards addressing that issue and better aligning the rewards to the participants, is to analyse the effort required by each user group and re-evaluate the relative weights of the end-rewards for each process. To further extend that, upon receiving usage data, a second step would be to cluster (within groups) individuals that display similar usage patterns and create specific missions and challenges for them to attain. Being able to bring the difficulty level of each process goal to a tailored degree will enable the overall gamification goals to become appealing to a larger segment of the end-users, leading a step closer to personalized gamification structures.

In terms of architecture the present version of the ecosystem has the gamification framework and game elements developed within each respective module (Authoring tool, Collaboration platform, Store and player). This can create an issue in terms of scalability as there is a dependency on each module. An approach to mitigate potential issues is to create a separate high level module for the gamification that will centrally manage the game-elements and their dynamics across the ecosystem.

Lastly, as currently a number of base game-elements are extant in the Q-Tales ecosystem, during operation additional game-elements (e.g. Visual storytelling, Easter eggs, Random rewards etc.) can be introduced and evaluated for the extension of the Gamification Framework with additional playful affordances.

This research constitutes the initial phase of the creation of the overall gamified supporting mechanism and as such limitations exist, as described by the challenges. An overall limitation is that as these game-elements are introduced to cater to the needs of a specific industry with respective end-users the need to further examine it in similar non-game contexts is present. Further research can examine the application of the Framework in other publishing sectors as well as the freelancing sector (as professionals that participate follow a similar approach) to examine its applicability. Overall, Q-Tales aims to become a European Leader in the field of children stories authoring and gamification is utilized as a multiplying factor to that end.

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