Crowdsourcing with Reward Systems: A complementary study on gamification's effect on user engagement and motivation

Mendes da Silva, Márcia

Universiteit Leiden

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by

Márcia Mendes da Silva

Master of Arts Thesis

In Book and Digital Media Studies

First reader: Peter Verhaar

Second reader: Irene O'Daly

Date of completion: 18 July 2022

Word count: 20,032 words

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1. Introduction

The digital age, also known as the information era, has been ‘home’ to a peak in new technological developments, as well as a time where information is more widely accessible and available, especially through the Web. This boom in technology and information has benefited many fields of research, in which more information is continuously generated from the increase in interdisciplinary research and access to previously hard-to-obtain, or even unattainable, data. This is possible to observe, for example, in the cultural heritage sector, in which more collections are being digitized and preserved online, becoming accessible for researchers and scholars to analyze and incorporate into their studies.

However, the opposite exchange is also true. More and more institutions explore crowdsourcing as a way to involve their community in different tasks, contributing to the digitization process whilst, simultaneously, making more information available for users. This is highly advantageous for institutions, as it is a cost-effective method that allows for users to contribute and interact with their collections, as well as help produce accessible and more easily findable data. That is not to say that crowdsourcing goes without risk. Aside from other disadvantages, crowdsourcing’s biggest risk is also its greatest quality: the users. In other words, given the fact that its community of users is the ones producing the data, they act as the heart of the crowdsourcing project. This can lead to a lack of results and/or unreliable data, which is influenced by many factors, such as the topic of the project, the tasks being performed, the instructions given, the relationship with the community, etc. However, the biggest aspect that affects results, simultaneously affecting the aspects previously mentioned, is a lack of user engagement and motivation. Briefly put, it is impossible for a crowdsourcing project to succeed with little to no participation from its users, who are the ones performing the task.

It is my belief that the key to a successful project lies, therefore, with increasing user engagement and motivation. This includes not only motivating users to perform the project’s task but also in interacting and bonding as a community with other participants. In doing so, this will maximize the community’s performance, which is encouraged to engage with the project, in the short and long term. A method that is sometimes used with the goal to increase user engagement and motivation is gamification, the act of using game design elements in non-game environments.

However, the effectiveness of gamification is still being discussed today, with some authors arguing that it may very well have the oppositive effect. That is, rather than increasing user engagement, gamification can instead negatively impact it, decreasing the innate enjoyment obtained by performing a task.

Given this ongoing debate, this thesis aims to study the effects of gamification on user engagement and motivation, particularly with the use of reward systems. These include point systems, level systems, leaderboards, medals/badges, status, progression systems, and competition. Besides examining whether reward systems can indeed contribute to user engagement, this paper also intends to study how different characteristics and aspects of the crowdsourcing project itself may affect the results of using gamification. In doing so, it is possible to begin to answer the question of whether gamification has a positive effect on user engagement and, consequently, establish what role gamification might have in producing a successful crowdsourcing project. Additionally, in looking for how a reward system may contribute to user engagement, it will be possible to analyze what factors are essential to increase the chances of obtaining positive results.

1.1. Structure

Chapter one will, in general, focus on establishing essential terminology. Given its importance, crowdsourcing is described in detail, as well as some of its most relevant disadvantages, advantages, and tasks often crowdsourced. Additionally, it will attempt to define success and factors which may contribute to it within a crowdsourcing project, such as an effective methodology and user interface, and the community's interactions. Regarding the latter, the importance of user engagement and motivation is underlined, given that it is the primary focus of this thesis, as well as some of the elements which may increase it, including immersion and gamification.

Following this, chapter two will, specifically, study how to increase user engagement and motivation. It will be essential to first define motivation and how it varies from user to user, focusing on three different types of motivation: intrinsic, extrinsic, and altruistic. In learning what motivates the community, as well as how it adapts to the different users, it will be easier to study how gamification and,

particularly, reward systems affect user engagement. Aside from describing the different reward systems which will be studied, other pivotal aspects to consider when gamifying a project will be discussed. These will allow me to create a list of factors essential for the success of a reward system and, in consequence, a higher chance of a successful crowdsourcing project. This will be used in the next chapter.

Finally, in chapter three I intend to test whether reward systems can be used to induce a positive effect on user engagement and motivation. This will be done by examining how a reward system can be created and adapted to three different sets of core tasks, which are often observed in crowdsourcing projects. The first part will analyze how reward systems can affect a project with multiple tasks, in this case, transcription, correction, and markup. The second one will merely focus on the effects of reward systems in crowdsourcing OCR correction to the public, although other obstacles may exist, such as multilingual data. Finally, the last segment will examine whether reward systems can positively affect user engagement and motivation regarding linking data and contextualizing objects. Given these two tasks, which differ in the ideal target audience and end goal, it will be interesting to study whether a reward system would still be feasible to create and adapt to the project.

2. A Definition of the Terminology

2.1. Crowdsourcing

Although it has been around for many years, the term 'crowdsourcing' is still adapting to the continuous changes society and technology are going through. Originally coined by Jeff Howe and Mark Robinson, it is generally described as 'the practice of using contributions from a large online community to undertake a specific task, create content, or gather ideas', whether that involves some kind of payment or not.[1]

Whilst some definitions focus on crowdsourcing as a method to extract labor from a crowd, others tend to describe crowdsourcing as a means to engage passionate researchers or amateurs in the creation and development of a specific task and, in general, of public goods.[2] Although the latter definition implies a hope to initiate a specific form of interaction, it is definitely possible to achieve. This is influenced by the fact that the public enjoys contributing to something bigger than themselves, desiring to actually be consulted or be the author of certain data, rather than maintaining the usual passive role as a reader.[3]

There have also been authors who distinguish different terminology based on the audience that is doing the work. Whereas the use of the term 'crowdsourcing' has been limited to projects whose task is completed by 'aleatory' people from the crowd, the word 'community-sourced' defines projects who count on the participation of members of a previously established community.[4] Given the community's commitment and loyalty, the latter facilitates with gathering and engaging a crowd, and creates more trustworthy and reliable data. In contrast, the audience for a crowdsourcing project is broader and more flexible, being able to reach both amateurs and professionals from multiple fields, although this is dependent on the project's goal and target audience.

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[1] M. Terras, 'Crowdsourcing in the Digital Humanities', in *A New Companion to Digital Humanities*, ed. by S. Schreibman, R. Siemens, and J. Unsworth (Wiley, 2016), p. 420.
[2] T. Owens, 'Making Crowdsourcing Compatible with the Missions and Values of Cultural Heritage Organisations', in *Crowdsourcing our Cultural Heritage*, ed. by M. Ridge (Farnham: Ashgate, 2017), pp. 269-270.
[3] P. Ford, 'The Web Is a Customer Service Medium', *Ftrain.com*, January 6, 2011, <https://www.ftrain.com/wwic> (27 May 2022).
[4] L. B. Philips, 'The Role of Open Authority in a Collaborative Web', in *Crowdsourcing our Cultural Heritage*, ed. by M. Ridge (Farnham: Ashgate, 2017), p. 257.

Despite there being a separation between the two terms, both of these types of projects can easily be connected. A community-sourced project implies that there is already a community engaged with whatever institution is behind the project. Nevertheless, no institution is born with a fully engaged, dedicated community and, therefore, engagement always needs to be stimulated first. Instead of arguing that 'community-sourcing' and 'crowdsourcing' are distinct terms, it would be preferable to simply see both forms of interaction as basic forms of crowdsourcing. In both cases, the aim is to outsource labor, regardless of the type of crowd performing the task. Whether the participants are unknown or part of an established community is less relevant. Additionally, audiences for both 'community-sourcing' and 'crowdsourcing' projects are dependent on their tasks and goals (e.g., a project whose task is difficult by nature, such as coding, may prefer to turn to an experienced and dedicated crowd, rather than risk the quality of the output by allowing people with no experience to participate).

Although the term 'crowdsourcing' is quite relevant nowadays, it was not used until 2006. However, the importance and strengths of a collaborative community were emphasized years before. In 1971, Eric S. Raymond briefly wrote that a model developed in isolation, with no contribution from volunteers, would, in time, be overthrown by a model with open methods for collaboration, allowing different opinions and approaches.[5] This notion would later contribute to the open-source movement, encouraging the production of software that can be reused, modified and corrected, whilst simultaneously highlighting the possibility to reduce the number of mistakes (in the sense that there are more people to identify and to correct said mistakes). The growing scholarly interest in the disadvantages and advantages of collaborative work is, therefore, evident from way before 'crowdsourcing' was used, an interest which has continued to peak until today.

There are elements which are essential in the creation of any crowdsourcing project, particularly the methodology and user interface, and the community. These will be studied more attentively later in this thesis, but it is important to establish a clear notion of why these elements are so important. The methodology refers to the way a task of a crowdsourcing project should be performed by the crowd.[6] Such tasks are

[5] Ibid., pp. 249-250.

[6] A. Masinton, *Archaeology Data Service Human Guinea Pigs and Casual Collaborators: Crowd Sourcing Data for Archaeology*, workshop, King's College London, May 2012, p. 2, <https://www.kcl.ac.uk/research/archive/arts/croud-sourcing-study/masinton.pdf> (21 April 2022).

always carried out via a user interface. As will be explained later in this chapter, it is essential that these are intuitive and provide enough guidance for the participants to feel confident in their skills and motivated to continue to engage with the project. This connects with the importance of the community. Given that the online community is the one undertaking the tasks, the project is dependent on their motivation to contribute. This is possible to achieve through different methods, one of which is gamification, which has been described as 'the use of game design elements in non-game contexts'.[7] This will be studied in-depth in the next chapter.

2.1.1. Risks and Challenges

One disadvantage of crowdsourcing is the fact that the data and results of a project are almost completely dependent on the community. This can lead to two problems: lack of results and unreliable data. The first is related to the fact that crowdsourcing projects ultimately depend and count on the contributions of the public, despite there being no guarantee that the public will participate. In a regular project, the work is generally done by one or more employees, which is not the case with crowdsourcing, in which the crowd has no direct relation with the project. Even if a certain community exists, which increases the chances of obtaining results, there is still no guarantee that this will be the case. In that sense, crowdsourcing functions as gambling, with those behind the project taking a risk for the chance of obtaining the desired result. Furthermore, if there are results (even a high number of them), there is still the possibility of it being of low quality. This could be due to a number of things, including a non-intuitive interface, bad methodology, and a lack of instructions. Despite these aspects, there will always be a certain unreliability in data that comes from the public's performance, given the variety of proficiency, backgrounds, and personalities that might participate in such a project. In addition, there will always be overall mistakes that could come from a misunderstanding of the task or, simply, distraction.

Fortunately, there are ways to try to prevent or reduce these risks and disadvantages, although they will never completely cease to exist. In relation to the

[7] S. Deterding and others 'From Game Design Elements to Gamefulness: Defining Gamification', *Proceedings of the 15th International Academic MindTrek Conference: Envisioning Future Media Environments*, September 2011, p. 10, <https://doi.org/10.1145/2181037.2181040>.

uncertainty about the number of results, for example, the main focus should be to develop ways to captivate and engage a community, particularly into wanting to participate. Such motivation can be fostered via monetary purposes, an interesting topic, the idea of contributing to the greater good, etc., but also by promoting the project actively, through self-written blog posts (or written by others), being active on social media, participating in interviews/podcasts, and, overall, creating an interaction with the public. This is possible to observe in 'Transcribe Bentham', in which Causer and Terras admitted that the project's growth in popularity was, in part, due to the New York Times article written about it, and similar media coverage.[8] This is, of course, dependent on the circumstances and opportunities available for each project, but the point to make is that there should be an active search for participants, rather than a static process of 'sitting and waiting'. In relation to the unreliability of the data, this can, as mentioned before, be due to multiple aspects, mostly related to the methodology and interface. If a methodology is overcomplicated, not intuitive and/or lacks the proper guidance for the user to be able to understand and complete the task correctly (e.g., instructions), then the data will be unreliable. As part of the methodology, the same applies to the interface. Therefore, by creating a methodology and an interface that can contribute to an easier and more intuitive understanding of the task at hand, the chances of obtaining unreliable data are smaller. If it is feasible, a project should, from the get-go, count on manually reviewing the data obtained, as it is the best way to assure data quality.

There are other disadvantages to crowdsourcing, such as the lack of confidentiality, in the sense that private information or documents become available for the public to access. It is true that crowdsourcing projects can decide to only allow registered users to access these documents, which requires their consent to the terms and conditions of the project. However, studies have suggested that forcing users to create accounts may lead to a decrease in motivation.[9] Another disadvantage is the inclination to see the crowd as simply a big number, since there is not as much contact with the public as there is with workers in a company, for example. As result, users might be

[8] T. Causer and M. Terras " 'Many Hands Make Light Work. Many Hands Together Make Merry Work': Transcribe Bentham and Crowdsourcing Manuscript Collections", in *Crowdsourcing our Cultural Heritage*, ed. by M. Ridge, (Farnham: Ashgate, 2017), p. 65.

[9] S. M. Leon, 'Build, Analyse and Generalise: Community Transcription of the Papers of the War Department and the Development of Scripto', in *Crowdsourcing our Cultural Heritage*, ed. by M. Ridge (Farnham: Ashgate, 2017), p. 102.

discouraged to participate. It is possible to attempt to interact with the public, via email, for instance, creating a deeper connection between staff and community. However, this is dependent on the size of the project, as well as the staff behind it since they might not have the capacity to message every user individually. These two disadvantages lack perfect solutions, as all options have their own defects. Nevertheless, in comparison, crowdsourcing also has many advantages.

2.1.2. Advantages and Motivations

One of the advantages is the creation of new opportunities for larger projects that would not be necessarily impossible, but hard to complete because of the vast amount of data to be 'handled'. Furthermore, while it is true that machines and computers have been continuously developing and allowing the study of big data, some tasks are not easily done by machines. Transcriptions are a good example of this, specifically of handwritten text, since they are more prone to error when performed by machines, rather than by human hand (e.g., Applying Optimal Character Recognition, OCR, to manuscripts is going to be more unreliable in comparison to human intervention, due to varied, complex and difficult handwriting and layout).[10] In normal circumstances, a large transcription project would be hard to complete given that possibly extensive corpus to be transcribed. Crowdsourcing can serve as a solution for this, since the number of people participating in such a project is much higher, consequently, creating more transcriptions. Not only that, but crowdsourcing can, technically, contribute to machine learning. This possibility is observable in the CAPTCHA google security system, which uses the need for website users to be authenticated as motivation to harness the public to do a task that is not yet possible to machines, in turn, serving as information for the machines to learn from.[11] Furthermore, most machine learning

[10] M. Hedges and S. Dunn, 'How the Crowd Can Surprise Us: Humanities Crowdsourcing and the Creation of Knowledge', in *Crowdsourcing our Cultural Heritage*, ed. by M. Ridge (Farnham: Ashgate, 2017), p. 240; R. Cordell, 'Machine Learning + Libraries: A Report on the State of the Field' (Library of Congress, 2020), < https://labs.loc.gov/static/labs/work/reports/Cordell-LOC-ML-report.pdf> (04 June 2022).
[11] K. C. Lee, 'CAPTCHA for Crowdsourcing: Prove You're Human', *Medium*, November 5, 2019, <https://kevin-c-lee26.medium.com/re-captcha-prove-that-youre-a-contributing-member-of-humanity-b9c9090f8e8> (27 May 2022).

algorithms for OCR and Handwritten Text Recognition (HTR) have been trained using texts transcribed manually in crowdsourcing projects.[12]

Another advantage is the cost-effectiveness of crowdsourcing. Although crowdsourcing also has its expenses, it is generally less expensive than a normal project, in which a whole team would need to be assembled and paid for. Not only that, but there are also expenses related to providing the proper tools and spaces to work and, in some cases, even insurance. Crowdsourcing, on the other hand, allows for labor to be done from home and, possibly, by a larger crowd. Furthermore, tools are often already developed and available to use online. If we highlight the difference in time spent on doing a task and the overall workload produced, the cost-effective nature of crowdsourcing is hard to beat, given that it is possible to obtain contributions from a larger number of people for fewer expenses, even if only a few participate regularly.

The close relations between the work and the crowd can also lead to advantages, such as, for example, the increase in accessibility, discoverability, and preservation of collections and the institutions holding them. This implication is directly related to the creation and/or digitization of content that is more easily and widely accessed and used, which can result in more research. Consequently, this leads to the spread and creation of more knowledge, since more data is available for students, researchers, and, overall, the public to explore, study and connect with. Crowdsourcing can also generate publicity for the institution withholding the project, working as an effective marketing tool.[13] What is more, the relationship which arises between the public and the collections they work with can not only be advantageous for institutions since they can benefit from it and learn to better understand their users, but also for the public, which can develop bonds within the community, as well as with the collections they are working on. The latter was observed during the transcription of the Civil War diaries managed by the University of Iowa Libraries, which was crowdsourced in 2011. Besides acquiring a high number of transcriptions and increasing accessibility and visibility to the library, reaching 70,000 visitors at one point, the project also showed that the community often

[12] R. Cordell, 'Machine Learning + Libraries', pp. 23-26.
[13] 'Pros and Cons of Crowdsourcing', *BohatALA*, <https://bohatala.com/pros-and-cons-of-crowdsourcing/> (27 May 2022).

felt involved with the story told in the diaries, which for Nicole Saylor, head of the project, was the most exciting and gratifying part.[14]

2.1.3. Within the Humanities

Given the previous discussion, it is safe to claim that the advantages of a crowdsourcing project can outweigh the disadvantages, as long as the nature of the task at hand is taken into consideration. Not every task will benefit from such an approach. A field which has benefited from this, and which serves as a clear illustration of the advantages of community involvement, is the humanities, which has seen an increasingly more common use of crowdsourcing. Scholars have benefited from crowdsourcing serving as a tool for digitizing, transcribing, correcting, and computing large amounts of data, consequently, increasing the accessibility to new data and creating the possibility of doing new research. Similarly, the GLAM (Galleries, Libraries, Archives, Museums) sector has also benefited from this.[15]

In their book, 'Academic Crowdsourcing in the Humanities', Stuart Dunn and Mark Hedges argue that in order to understand how crowdsourcing can contribute to knowledge and cultural value within the humanities field, it is necessary firstly to understand the life cycle of crowdsourcing in humanities. With this in mind, they aimed to establish a methodological model for humanities crowdsourcing, suggesting a framework constructed around four facets: asset, process, task, and output.[16] Briefly put, these entail that any crowdsourcing activity does something to an asset by means of a type of task, which produces a particular output, all of which are put together by the processes involved. For example, a project that means to transcribe a whole collection of manuscripts goes through the process of transcription, where particular assets (texts, in this case) are the object of a particular type of task (in this example, a mechanical and, sometimes, also editorial one), which results in a specific outcome, that is, a

[14] B. LeFurgy, 'Crowdsourcing the Civil War: Insights Interview with Nicole Saylor', *Library of Congress*, December 6, 2011, <https://blogs.loc.gov/thesignal/2011/12/crowdsourcing-the-civil-war-insights-interview-with-nicole-saylor/> (27 May 2022).
[15] M. Ridge, 'Crowdsourcing Our Cultural Heritage: Introduction', in *Crowdsourcing our Cultural Heritage,* ed. by M. Ridge (Farnham: Ashgate, 2017), p. 1.
[16] M. Hedges and S. Dunn, 'Processes and products: A typology of crowdsourcing', in *Academic Crowdsourcing in the Humanities* (Elsevier, 2018), pp. 27-49, <https://doi.org/10.1016/B978-0-08-100941-3.00003-6>.

transcribed text. Depending on all of these aspects, there can be the production of new knowledge, as well as lead to the creation and enhancement of digital content. It is, nevertheless, important to highlight that there are other aspects on which crowdsourcing is dependent, such as the fact that all of the tasks require enthusiasm, commitment, and time to perform, which varies with the demand that is put on the user, that is, the type of task.

2.1.4. Types of Tasks

It is possible to establish common tasks which are frequently crowdsourced within the humanities, although it is necessary firstly to consider the term 'task' at a more fundamental level. In terms of crowdsourcing, a task can be defined as an activity that a participant undertakes in order to create or alter an asset, which may vary in complexity.[17] Based on a combination of typologies from different authors (Dunn and Hedges, Mia Ridge, and Johan Oomen, Riste Gligorov and Michiel Hildebrand), as well as from a collection of different projects, I have divided them into five different tasks:

1. Transcriptions
2. Corrections/modifications
3. Classification and contextualization
4. Complementing collections
5. Translations.

It is worth noting that other types of crowdsourcing exist, such as co-curation and crowdfunding. However, given the scope of the paper, these were left out of the typology, as they do not include a particular task. Furthermore, it is also important to highlight that this division does not imply that each type functions separately. Transcriptions and corrections/modifications or classification and obtaining/complementing metadata are often used in the same crowdsourcing project.

Transcriptions are one of the most common crowdsourcing forms in humanities, given the amount of material that exists that needs to be digitized (and the opportunity that is crowdsourcing this type of project). As mentioned before, certain tasks within the

[17] Ibid., p. 44.

humanities either cannot be done by machines or they can be done only poorly, resulting in an output riddled with errors. The creation of transcriptions is one of them, since most materials that need to be digitized are handwritten, making it difficult to automatically render the text into a machine-readable format. Even with research and developments being done in this particular area, the most reliable source for transcribing texts is still manual transcription by humans, partly due to the power of interpretation.

Manual transcription appears to be a task which can be delegated effectively to a community, as most audiences will be able to participate given the relatively simple nature of the task. Crowdsourcing also reduces the workload, expenses, and time needed to perform this task, which would be substantially bigger in a regular project. In other words, crowdsourcing allows for more work to be done in less time, and with less effort and expenses. It is no surprise, therefore, that multiple transcription crowdsourcing projects have been successful, such as 'Transcribe Bentham', 'What's on the Menu?', and 'Papers of the War Department'.

The second type of task encompasses corrections and modifications that are done to different assets, most commonly, text. This is often done 'hand-in-hand' with transcription since transcribed texts are likely to have errors, whether that is due to distraction, misreading (for example, due to a particular handwriting), or wrong interpretations. As is the case for transcription, it is also possible to correct texts using machines, but it is very likely that this process will ultimately lead to even more errors to correct. These corrections and modifications can be done by the staff on the project, as a way of quality control, but are also often done by the public, as an attempt to enhance the accuracy and reliability of the output, whilst, simultaneously, lowering the workload of the staff (e.g., 'Old Weather').

Classification is an activity that involves any form of categorizing, describing, or linking particular objects or information. In other words, obtaining or associating descriptive metadata to the different assets in collections. One of the most common tasks of this type is image tagging, in which the public can apply labels that describe and name a particular asset, such as images and/or text. For instance, 'Waisda?' asked the public to engage in social tagging different videos, based on what they hear and see, comparing the results obtained to other participants. Another example is 'Your Paintings Tagger', which invites participants to provide metadata about the collection of paintings, using 'descriptive' tags. Other commonly used tasks within crowdsourcing

are categorizing (assigning different objects to categories, such as morphology, word classes, etc.) and linking (finding links between objects and documenting them).

The process of contextualization involves adding contextual information to objects, whether that is relevant information and/or new content. This task is useful as the broader audience can increase the chances of obtaining contextual information on an asset, which is the main objective. In some cases, contextualization can also be a type of classification since this contextual information can come from adding or linking information to a certain object.

Complementing collections encompasses any activity which gathers more objects for a collection, whether that is texts, images, or videos, therefore, complementing an existing collection. Under certain circumstances, particularly if a user adds textual information about the context of an object, this type of crowdsourcing may be seen as a subdivision of contextualization. However, for the sake of this thesis, I have split the two into different types. This is due to the fact that complementing a collection is meant to refer to addictions to a collection, in which projects can request the public to participate in taking photographs, sharing their own stories, writing or gathering texts, and many more. An example of this is the 'Click! A Crowd-Curated Exhibition', in which the first part of the project asked photographers to take pictures responding to the exhibition theme (although, besides that, the crowdsourcing task of this project was the co-curation of an exhibition, since the public contributed to its design). Commentary can also be a part of this task if its output offers additional information, beyond mere description.

Finally, translation is a task that requests the public to translate assets from one language to another. Although this task can be useful, it can be more restrictive than other tasks, given the requirement of being proficient in the language.

Despite the growth in the use of crowdsourcing within the humanities (and in other fields), the success factors of such projects are still being studied and discussed. In order to contribute to this debate, it is essential to define what success is within the context of crowdsourcing, as well as what criteria are necessary to achieve it.

2.2. Success

It is hard to define and identify what factors contribute to success. Generally, success can be described as 'the achieving of the results wanted or hoped for',[18] therefore emphasizing a connection between success and previously established goals, whether that is by an individual, institution, and so on. Likewise, the success of crowdsourcing projects depends on the question of whether or not the pre-defined goals for the project have been achieved. Besides its end-goal, which should be the reason a project is created (e.g., digitizing a collection), other goals are important to pre-establish, such as the number of contributions, the user experience (observed through their engagement, but also the users' opinions), the quality of the contributions, and the frequency of the participation. In most cases, the goals of a project can be achieved more effectively if the methodology and user interface are clear, and if the project manages to engage the public.

Success is also related to the nature of the task to be performed by a crowdsourcing project's community. In other words, before adapting the idea of crowdsourcing a task, it is essential to understand whether it is desirable that this task is performed by the public, and whether this is the best way to achieve the previously set goals. This is of the greatest importance because creating a project from scratch is time-consuming and involves expenses, which, in the end, may fail to be compensated. Needless to say, some tasks are more inclined to be successful than others, given their characteristics (e.g., interesting topic, simple and easy task, fewer restrictions in terms of audience). One of these tasks is transcription. For example, 'Transcribe Bentham' is an award-winning project, in which the main goal was to transcribe Bentham's manuscripts. Although the success of 'Transcribe Bentham' is influenced by many aspects, the nature of the project is one of them, fitting with the concept of crowdsourcing. Given their end-goal of transcribing Bentham's manuscripts, the success of the project was observable through the number and quality of the contributions, the frequency of the participation, and the public experience. It is, therefore, possible to conclude that crowdsourcing was advantageous for 'Transcribe Bentham' since the rate of transcriptions grew much faster than it would in a regular

[18] Cambridge Dictionary, 'Success', <https://dictionary.cambridge.org/pt/dicionario/ingles/success> (20 April 2022).

transcription project. In comparison to the latter, the efforts of setting up a crowdsourcing platform are well compensated in terms of results, which is what makes this project successful. As Bentham said himself, 'many hands make light work'.[19]

Aside from that, it is also important to highlight that the goals of the project should be of a realistic and achievable nature, that is, possible to achieve within the scope of the project. For illustration, it is unrealistic to aim for a big crowdsourcing project to be finished within a month, since the data may be too much in comparison to the community performing it (which might yet not be fully built). Yet, prolonging the period to finish the project and being conscious of what is and is not possible, increases the rates of success.

As established, the nature of the project and its goals are important for a successful crowdsourcing project. Given that these help with the decision of whether it is advantageous to make use of crowdsourcing in a project, both should be the first criteria to be considered. In other words, by considering these aspects first, the chances of the advantages outweighing the disadvantages of crowdsourcing are much higher, although both will always exist. It is possible to consider some best practices when deciding if a project fits within these criteria, such as the complexity of the task and comparison with previous projects.

Given the accessibility and diversity that crowdsourcing projects offer, it has been argued that these type of projects is particularly useful for tasks that are easy to understand and which require either diversified points of view and/or, in general, a large number of people.[20] However, depending on the complexity of a project's task, a diversified crowd with different levels of knowledge might not be ideal. Even so, they might still benefit from crowdsourcing. For example, transcriptions are a very common and successful task to crowdsource because they usually require no prior knowledge (in the case of a language which the crowd masters). Although there are cases in which codicological or paleographical knowledge is needed, in general, it is only required that an audience has the time and effort to read and transcribe. However, to markup that same transcription, that is, attributing 'tags' to certain parts of the text according to what

[19] London, University College London (UCL) Library Services, Bentham MS Box 107_020, December 21, 1793, <https://ucl.primo.exlibrisgroup.com/permalink/44UCL_INST/5apqbq/alma9931463277404761>.
[20] M. Hosseini and others, 'The four pillars of crowdsourcing: A reference model', in *Proceedings of the International Conference on Research Challenges in Information Science*, vol. 1, no 12, 2014, p. 1, <http://dx.doi.org/10.1109/RCIS.2014.6861072>.

they are, requires prior knowledge (or, at the very least, extra support, such as guidelines). That is not to say that the latter should not be crowdsourced, as there have been successful projects involving marking up text (e.g., Transcribe Bentham, Collecting Epistolary Metadata of the Republic of Letters (CEMROL)). However, acknowledging and understanding the complexity of the task at hand, and whether it is worth to still rely on crowdsourcing based on other advantages it might bring, is essential. If a complex task may still benefit from crowdsourcing, then the best course of action is to simplify it, whether it is by offering extra information (instructions), tutorials, workshops, and/or extra tools for the crowd to work with.

A reliable source when creating and setting the goals of a crowdsourcing project is by analyzing previous projects which have done similar work. Not only is the number of similar projects an indication of whether a certain task will benefit from being crowdsourced, but it is also helpful to study what others did and did not do correctly (and whether it is fixable). Returning to my previous example, there are a large number of transcriptions projects which were successful, such as 'Old Weather' and 'FamilySearch Indexing', also resulting in the development of helpful tools, such as 'Scripto' (developed for the 'Papers of the War Department' transcription project). However, not many projects have asked the crowd to add markup to these transcriptions, despite it being advantageous since it can facilitate the searching of files. Nevertheless, there have been projects which were successful in crowdsourcing. 'CEMROL' is a good example of this, although it required some stricter data quality control. Besides helping decide whether a task is worth crowdsourcing, a comparison with similar projects can also help to set realistic goals for a project, since they allow for expectations to be rectified through their analysis (although, of course, each project is unique).

2.2.1. Factors Contributing to Success

Methodology and User Interface

A good methodology and user interface design are essential for the success of a crowdsourcing project (or any project, for that matter). In terms of methodology, it is not only important to have a good methodology, but also to clearly communicate its

instructions to the public. If not, the problem is then that the crowd may not be able to follow the guidelines. This can be due to the fact that methodologies do not always convey how they should be performed correctly, which is important given the fact their aim is to increase efficiency. With crowdsourcing, even if only a part of the public misunderstands the methodology, the output can be massively affected, depending on aspects such as how regular the user is and/or how many users there are. This further highlights the importance of a clear, simple, and intuitive communication of the methodology. As part of the methodology, projects also need to focus on the user interface, whose design should, similarly, adapt to the public, facilitating the process of users carrying out a task. In order to design a good user interface, the Interaction Design Foundation has argued that it needs to be usable, clear and intuitive (creating a seamless experience), enjoyable (predicting the users' needs and adhering to a fun design), and, overall, trustworthy and likable (if users associate the user interface to good feelings, it is more likely that they will come back).[21]

An effective methodology and user interface design can, therefore, contribute to the success of a crowdsourcing project, being created with its goals in mind. More specifically, when both of these elements are clear and intuitive, this is likely to improve the quality of the data that results. It will also lead to a higher intensity of engagement, due to the positive feelings associated with the interface. However, measuring how effective a methodology and user interface are before being tested by the crowd is difficult, as it is necessary to compare the crowd's input with the initial intention, and to study whether a crowd can correctly gather what and how to do a specific task. This may pose as a challenge to institutions since there is still a risk that the project will fail once it actually reaches the public. For example, constructing tools to aid with a task is extra work and expenses, and there is no guarantee that such efforts will be paid off, as the methodology could still be ineffective and produce bad quality data from the crowd. An aspect that can be implemented to reduce the chances of a bad methodology and interface is doing test runs before launch. In other words, gathering a smaller audience or panel to do the tasks and give feedback before the start of the project. This is similar to what developers do with videogames, where their program is tested before the launch of the game.

[21] 'User Interface Design', *Interaction Design Foundation*, <https://www.interaction-design.org/literature/topics/ui-design> (27 May 2022).

In relation to the task at hand, there are two possible general solutions, depending on the aim of the project: to envision and choose a specific target crowd for the project, which facilitates the construction process and increases the possibility of creating an effective methodology, or to transform the tasks into the simplest form possible, whilst guiding the crowd through, for example, instructions, tutorials and/or specific tools that facilitate the task.

In relation to the first, it might be argued that having a more specific target crowd also decreases the number of people that are participating in the project. In other words, gathering a crowd is hard enough without restrictions, let alone if a project only wants participants who are proficient in a particular task. However, some authors believe this to be an advantage, in the sense that it could be helpful to invite participation from an engaged audience who has a professional mindset, which means that there is a need for external opinions or sources of innovation.[22]

Simplifying a task, on the other hand, means aiming for a broad and varied crowd, increasing the risk of an ineffective methodology, given the different levels of knowledge among the participants. Nevertheless, this can also be viewed as an advantage since it brings more diversity and independence to the project. James Surowiecki has argued that these two factors are necessary to guarantee that a crowd is wise (to make their own decisions), and, therefore, beneficial. In terms of diversity, it guarantees new perspectives and lessens or eliminates some of the 'destructive characteristics of group decision making'. Independence, on the other hand, guarantees intelligent decision-making and the sharing of new information, rather than adding information that is familiar already.[23] Nevertheless, it is only possible to take advantage of this if the method chosen by a specific project is simplified as much as possible, in order to meet the audience's needs for guidance. This is especially relevant in tasks that are naturally difficult or require knowledge in a specific domain.

A good example of this is, again, 'Transcribe Bentham', which, besides digitizing their collection of manuscripts written by Bentham, also requested that the crowd performed TEI markup. The point to make, however, is that the project quickly

[22] T. Owens, 'Making Crowdsourcing Compatible with the Missions and Values of Cultural Heritage Organisations', p. 269.
[23] J. Surowiecki, *The Wisdom of Words* (New York: Anchor Books, 2005), p. 29 and p. 40, <http://www.asecib.ase.ro/mps/TheWisdomOfCrowds-JamesSurowiecki.pdf> (27 May 2022).

realized that although most audiences could quickly understand how to transcribe Bentham, most would find the process of learning TEI much more difficult. By recognizing from the onset that their audience may not have any experience with markup, the project was able to develop a tool, the Transcription Toolbar, to support the encoding process which, consequently, simplified the task at hand and contributed to the success of the project.[24]

Another important aspect to achieve success is to consider ways in which the user interface can help to clarify the methodology. Such aids have been mentioned before, consisting of guidance elements like written instructions or even a tutorial, which can be of various formats, including written text, audio, animations, and video. Such additional instructions all have the objective of explaining and guiding an audience through a task. Moreover, elements such as comment sections or chats allow users to ask questions and give feedback, which is essential to knowing the strengths and weaknesses of the methodology and, in general, of the project. They can also be advantageous for the public, since it has been argued that it contributes to their engagement.[25]

Participation and User Engagement

Finally, other criteria which can contribute to a project's success, specifically in crowdsourcing, is the crowd's interaction with the project. In other words, the participation and engagement of the public. This is particularly important since the participants are, metaphorically, the heart of any crowdsourcing project, being vital for the project to exist in the first place. Therefore, observing the public's participation and interaction with the project, as well as listening to what they have to say about it, is also important.

For instance, cultural heritage institutions are turning more and more into digitizing their collections, given that it increases the accessibility and preservation of their collections. In this case, success depends on the relation the public has with these digital collections, which can be observed through the way 'people use, reuse, explore

[24] T. Causer and M. Terras " 'Many Hands Make Light Work. Many Hands Together Make Merry Work' ", p. 60-61.
[25] P. Ford, 'The Web Is a Customer Service Medium'.

and understand these objects'.[26] With crowdsourcing, the same applies, that is, the public's reactions and interactions with the data serve as criteria for success. Taking the example given before, if a cultural heritage institution were to create a crowdsourcing project to help correct and expand their collections, then it would be necessary to observe the public's interactions, focusing, for example, on the number of volunteers (regular and non-regular), the quality of their work, and their feedback. If these showcase positive results throughout, then the institution can be confident that the project is a success, the same way that, in the first example, a positive relationship between the public and the digitized collections indicates success. Alexandra Eveleigh further argued that any project that involves participation, as well as its goals, are entirely dependent on the public's response, being vital to match the intended outcomes to contributor's likely motivation and patterns of behavior.[27]

However, perhaps most important to observe within a crowd is their engagement in the task and, in general, in the project, as well as their motivation levels. In fact, Mia Ridge has argued that the path to a successful crowdsourcing project requires, amongst other elements, an understanding of the motivations for participation, both in the short and long term.[28] It is, therefore, necessary to ensure that not only are users being captivated to join the project, but also that they are engaged and motivated to keep returning to it, in the long term.

One possibility to achieve this is through the 'flow' of the audience, that is, the 'state of "intense emotional involvement" and timelessness that comes from immersive and challenging activities'.[29] In psychology, this is often related to the theory of flow, originated by Mihaly Csikszentmihalyi, in which he proposes that one can reach a state of 'flow' if he experiences complete immersion in an activity, being characterized as a state of being intensely focused on the task at hand. This is intrinsically rewarding to a point that time and self-consciousness become distorted, although the person remains

[26] T. Owens, 'Making Crowdsourcing Compatible with the Missions and Values of Cultural Heritage Organisations', p. 277.
[27] A. Eveleigh, 'Crowding Out the Archivist? Locating Crowdsourcing within the Broader Landscape of Participatory Archives', in *Crowdsourcing our Cultural Heritage*, ed. by M. Ridge (Farnham: Ashgate, 2017), p. 216.
[28] M. Ridge, *Crowdsourcing our Cultural Heritage* (Farnham: Ashgate, 2017), p.2.
[29] J. Geirland, 'Go with the Flow', *Wired*, September 1, 1996, <https://www.wired.com/1996/09/czik/> (18 May 2022).

self-aware and in charge of his actions.[30] Furthermore, Csikszentmihalyi argued that multiple conditions contribute to this state, such as the balance between the level of difficulty of the activity and the level of skill, the creation of clear proximal goals, and the immediate feedback about the progress of each individual, having added competition as another possible way to get into this state.[31] It is important to highlight the difference between the characteristics of 'flow' and the conditions that contribute to it, since the first can be used to measure whether someone is experiencing such a state, whereas the latter are simply conditions which may or may not contribute to the achieving of this state.

Understanding how flow works is generally accepted as a key to progress, since it can be synonymous with understanding how to advance towards a certain target or goal. Not only is the state of 'flow' the path to achieving a pre-established goal, but it is also a dynamic state, in the sense that once an objective is reached, it results in the creation of new ones, which increase in difficulty, corresponding to a similar increase in the level of skill.[32] With this in mind, it is possible to argue that by progressing to achieve certain goals, which is possible through reaching a state of 'flow', the individual can reach success, since, given the definition above, there is a clear connection between success and pre-established goals. Furthermore, by applying this argument to crowdsourcing, it is possible to assume that once goals are pre-established within a project, immersion, and engagement of the crowd in performing tasks, which come from achieving a state of 'flow', can contribute to success.

It is important to note that, since the author first mentioned the theory in his book 'Beyond Boredom and Anxiety', in 1975, there has been much research on the concept of flow, which remains ongoing, with multiple inconsistencies between studies. Given that the objective of this paper is not to discuss 'flow' in detail, I will remain faithful to Csikszentmihalyi's descriptions and studies on the topic, given the fact that he is the creator of this concept, although research in similar concepts already existed,

[30] S. Abuhamdeh, 'Investigating the "Flow" Experience: Key Conceptual and Operational Issues', *Frontiers in Psychology*, vol. 11, February 13, 2020, <https://doi.org/10.3389/fpsyg.2020.00158>.
[31] J. Geirland, 'Go with the Flow', *Wired*.
[32] 'Mihaly Csikszentmihalyi & Flow', *Pursuit of Happiness*, <https://www.pursuit-of-happiness.org/history-of-happiness/mihaly-csikszentmihalyi/> (18 May 2022).

being ‘a term coined by a specific psychologist to represent his particular conceptualization of optimal experience’.[33]

Another way that has been argued to contribute to higher motivation engagement levels is gamification, which has been described as ‘the use of game design elements in non-game contexts’.[34] Although this terminology is the most commonly used in this context, being first documented in 2008, it is important to highlight that it is certainly not the only one, with other researchers suggesting terms such as ‘funware’ or ‘playful design’. Nevertheless, for the sake of this paper, I will be using the definition mentioned above, given the fact that it encapsulates each characteristic relative to a game, that is, the game itself, each element (which are not strictly used in games, but characteristic to them), the design (divided into different levels), and the non-game context.

That being said, when we refer to gamification in crowdsourcing projects, we refer to using design elements characteristic in games applied to the tasks of the project. That is not to say, however, that the elements applied are always the same. For example, gamification can come in the format of an actual game, as is possible to observe with the video tagging in ‘Waisda?’. In this project, the gameplay element focused on the reaction and accuracy of the players, which had to watch videos, tag what they see, and try to match other players’ answers.[35] In cases like this, it is the methodology that is gamified, to facilitate and encourage the public to tag images. However, gamification can also be the use of reward systems, often used as a motivator for the public.

Whether gamification is positive or negative for a crowdsourcing project is still very much being studied, which, consequently, gives place to multiple opinions on the topic. Trevor Owens has argued that applying gamification in crowdsourcing projects is, for the most part, bad. This is due to the fact that certain elements ‘trick people into doing things with gimmicks’, such as leaderboards and badges, which can ‘ruin the

[33] S. Abuhamdeh, ‘Investigating the “Flow” Experience: Key Conceptual and Operational Issues’, *Frontiers in Psychology.*

[34] S. Deterding and others ‘From Game Design Elements to Gamefulness: Defining Gamification’, *Proceedings of the 15th International Academic MindTrek Conference: Envisioning Future Media Environments*, September 2011, p. 10, <https://doi.org/10.1145/2181037.2181040>.

[35] J. Oomen, ‘Emerging Practices in the Cultural Heritage Domain-Social Tagging of Audiovisual Heritage’, 2010, pp. 13-15, <https://www.researchgate.net/publication/228585569_Emerging_Practices_in_the_Cultural_Heritage_Domain-Social_Tagging_of_Audiovisual_Heritage> (13 June 2022).

innately enjoyable nature of being a part of something that matters to you'.[36] Instead, he suggested that gamification is only justified when it focuses on the playful nature of taking on a big challenge, much like in most videogames. This argument, based on a blogpost by Ian Bogost, can be true if the project is completely stripped of interest and enjoyment besides what gamification offers.

Whilst it can be true that gamification (or 'exploitationware' like Bogost suggests) can be harmful to a project, there is evidence to suggest that it can actually have a positive effect if it is controlled and balanced, like the remaining aspects of crowdsourcing projects. In the same way a ranking system can discourage people to participate, an individual system of 'personal progress' can help the audience to observe his/hers contribution to the greater good, which is, in Trevor Owen's point of view, the overall objective. That is not to say that any competitive element is innately destined to ruin user engagement. In fact, it can increase it, under the right circumstances. What is important to highlight is that game mechanics can serve as a tool for further motivating a crowd, rather than these being the central point of motivation and focus of the whole project. Not only that but said elements can also serve as progress 'checkpoints' for personal use, which contribute to the volunteer's sense of contribution to the greater good.

That being said, in the following chapter I intend to dive more deeply into gamification, focusing more specifically on reward systems, such as ranks and points. The chapter aims to address the question of whether these can contribute to motivation and engagement. For that, I will need to discuss in detail what motivation and engagement are, and study how these played a part in previous crowdsourcing projects.

[36] T. Owens, 'Crowdsourcing Cultural Heritage: The Objectives Are Upside Down', March 10, 2012, <http://www.trevorowens.org/2012/03/crowdsourcing-cultural-heritage-the-objectives-are-upside-down/> (14 May 2022).

3. Increasing Motivation through Gamification

As mentioned before, the audience can be considered the beating heart of crowdsourcing projects since, without it, it is not possible for these types of projects to exist (or, at least, to progress). It is, therefore, important to capture an audience and motivate them to participate in crowdsourcing, both in the short and long term, keeping them engaged with the task at hand. Although there is no 'step-by-step' method that guarantees that a large crowd will be fully motivated to participate in a project, it is possible to adapt strategies to increase the rate of success (although some elements are harder to control, such as the nature of the task itself, whose characteristics may make it innately more enjoyable to perform than others).

3.1. Motivation

At its core, participation is dependent on motivation. Although there is no clear and broadly accepted definition of motivation, it is established as being what drives people to do the things they do. These drivers may be difficult to determine, since it varies with people's goals, beliefs and, ultimately, their personality.[37] For instance, whilst person A may be motivated by a competitive ambiance, given their desire to obtain a higher rank, person B may be discouraged by the competitiveness of the task. Even so, it is clear that establishing at least some notion of what motivates users to participate in crowdsourcing projects would be useful, since this information can be used in the design of multiple aspects of the project, such as the methodology, the user interface, etc.[38] Despite the fact that motivation varies from person to person, researchers have universally recognized two main types of motivation, namely, intrinsic and extrinsic motivation.

Intrinsic motivation can be described as the desire to achieve something due to the inherent satisfaction or pleasure in doing a certain task/activity, in which

[37] A. Usher and others, '1. What is motivation and why does it matter?', *Center on Education Policy*, 2012, p. 5 <https://files.eric.ed.gov/fulltext/ED532670.pdf> (06 June 2022).
[38] M. Strohmaier, C. Körner, and R. Kern, 'Understanding why users tag: A survey of tagging motivation literature and results from an empirical study', *Journal of Web Semantics*, Vol. 17, 2012, p. 1 <https://doi.org/10.1016/j.websem.2012.09.003>.

participation is a reward in itself. In other words, it can be described as participating in a task simply because it is fun or interesting, or even due to the sense of community that may exist.[39] As highlighted by Johan Oomen, Riste Gligorov and Michiel Hildebrand, this type of motivation is important given that it fosters amateurs to want to contribute, simply because they are interested in the subject or task at hand, consequently being more engaged.[40] Furthermore, it reaches beyond amateurs, since scholars who are simply interested or find the topic/task amusing may be enticed to participate. Both amateurs and scholars were observed in the 'Papers of the War Department' project, in which historical or genealogical researchers were its main contributors, although a smaller percentage was simply interested in the American Revolution.[41]

Equally important is extrinsic motivation, which is the desire to perform a task in order to obtain something in return, that is, an external outcome. Amazon's 'Mechanical Turk' rewards participants with monetary payment, but this does not have to be the case, with projects such as 'Waisda?' and 'Games with a Purpose' rewarding participants with points. Other rewards might be ranks, levels, virtual gifts, etc.

Ridge and others have also argued altruistic motivation to be another type of motivation.[42] In general, altruistic motivation refers to people's desire to help and contribute to 'the greater good', in this case, feeling good in contributing to something bigger than themselves. This phenomenon was observed in multiple studies, such as the Galaxy Zoo project, which required citizens to classify galaxies, and who found that most contributors' participation was due to the genuine interest and desire to contribute to science, with nearly 40% of respondents reporting this as their primary motivation.[43] Not only that but the previously mentioned projects 'Papers of the War Department' and 'Waisda?' also found that contributing to something bigger or simply making a civic

[39] A. Usher and others, '1. What is motivation and why does it matter?'; M. Ridge and others, '6. Understanding and connecting to participant motivations', in *The Collective Wisdom Handbook: Perspectives on Crowdsourcing in Cultural Heritage - community review version* (April 2021) <https://doi.org/10.21428/a5d7554f.1b80974b>.
[40] J. Oomen, R. Gligorov, and M. Hildebrand, 'Waisda? : Making Videos Findable through Crowdsourced Annotations', in *Crowdsourcing our Cultural Heritage*, ed. by M. Ridge (Farnham: Ashgate, 2017), p. 180.
[41] S. M. Leon, 'Build, Analyse and Generalise: Community Transcription of the Papers of the War Department and the Development of Scripto', p. 103.
[42] M. Ridge and others, '6. Understanding and connecting to participant motivations'.
[43] J. Raddick and others, 'Galaxy Zoo: Motivations of Citizen Scientists. Astronomy Education Review', *American Astronomical Society*, vol. 12, no 1, pp. 31-32, 2013 <http://dx.doi.org/10.3847/AER2011021>.

contribution was a motivation for their contributor's participation.[44] It is important to note that altruism is not always recognized as a distinct type of motivation, which may be due to the fact that it can easily merge with the other types. For example, being motivated in contributing to a community may be regarded as both an altruistic and intrinsic motivation if a contributor inherently enjoys helping people. However, it is also possible to argue that rather than merging with it, altruistic motivation contributes to intrinsic motivation. This is also observed with extrinsic motivation, which might include factors that make a task fun to perform and, therefore, increase intrinsic motivation. Additionally, according to the previous definition, participation in itself should be, independently, intrinsically rewarding. Given these reasons, altruistic motivation will be considered separately.

As mentioned, establishing the motives behind a user's desire to participate is difficult. For example, a user might start to contribute to a project due to extrinsic motivation, but end up seeing its intrinsic value and, therefore, be further motivated by it.[45] In terms of crowdsourcing specifically, this means that it is also hard to establish what strategies and design choices will induce participation and user engagement, both in the short and long term. In relation to their project, Alam, Sun and Campbell argued that intrinsic and altruistic motivation were important for recruiting participants and, therefore, useful for short term motivation, whereas extrinsic motivation, such as rewards or recognition, had a greater impact on long term participation.[46] Another study, this time on the contributor's motivations behind 'Transcribe Bentham' project, has shown that most participants were not stimulated to participate due to extrinsic motivation (e.g., leaderboards), but instead due to intrinsic and altruistic reasons. Despite this majority, it was still documented that the most active transcriber was also partly extrinsically motivated (and, admittedly, others might have been subconsciously motivated by it).[47] Ultimately, motivation varies with the project and tasks being crowdsourced, as well as with the users performing them. For example, Trevor Owens

[44] J. Oomen, R. Gligorov and M., Hildebrand, 'Waisda? : Making Videos Findable through Crowdsourced Annotations', p. 167; S. M. Leon, 'Build, Analyse and Generalise: Community Transcription of the Papers of the War Department and the Development of Scripto', p. 103.
[45] A. Usher and others, '1. What is motivation and why does it matter?', p. 3.
[46] S. L. Alam, R. Sun and J. Campbell, 'Helping Yourself or Others? Motivation Dynamics for High-Performing Volunteers in GLAM Crowdsourcing', *Australasian Journal of Information Systems*, vol. 24, 2020 <https://doi.org/10.3127/ajis.v24i0.2599>.
[47] T. Causer, *Transcribe Bentham*, workshop, King's College London, May 2012, p. 3, <https://www.kcl.ac.uk/research/archive/arts/croud-sourcing-study/causer.pdf> (10 June 2022).

criticizes extrinsically motivating users through gamification overall, particularly systems such as ranks or points, as simply ruining something that is enjoyable by nature and intrinsically appealing. On the other hand, authors like Jane McGonigal defend that the feeling of achievement obtained through extrinsic motivation, such as competition, contributes to engaging a crowd.[48] If both were to perform the same task, it is clear that they would be motivated by different aspects.

Essentially, when aspiring to motivate the largest amount of people to participate in crowdsourcing, it is best to cater to all the different types of motivation. This is possible by establishing what factors are present and which need to be increased. For instance, an intrinsically attractive task will benefit from the application of extrinsic and altruistic factors. By finding ways to combine all types of motivation, the number of people that want to contribute will be maximized, which has been observed in different projects, such as 'Transcribe Bentham' and 'Waisda?'. These projects generated intrinsic and altruistic motivation by relying on their interesting topics and transmitting to their audiences the importance of contributing to the project. However, they also turned to certain elements of gamification, such as ranking systems, to extrinsically motivate the public and, potentially, increase other types of motivation (for instance, creating a fun system can intrinsically motivate users).

3.2. Gamification as a Source of Motivation

As touched upon in chapter two, gamification's effectiveness is still very much up to debate. Results vary from project to project and, whilst some do not find any particular relation between gamification and high-levels of motivation for participation, others find the opposite to be true. For example, project leader of 'The Australian Newspapers Digitisation Program', Rose Holley, found that users defended that, amongst other elements, public recognition and public ranking tables would increase their motivation.[49] Additionally, gamification not only depends on the project itself, but also

[48] T. Owens, 'Crowdsourcing Cultural Heritage: The Objectives Are Upside Down'; J. McGonigal, 'Engagement Economy: The Future of Massively Scaled Collaboration and Participation', *Institute for the Future*, 2008, pp. 13-16 <https://www.iftf.org/uploads/media/Engagement_Economy_sm_0.pdf> (10 June 2022).
[49] R. Holley, 'Many Hands Make Light Work: Public Collaborative OCR Text Correction in Australian Historic Newspapers' (Australia: National Library of Australia, 2009), p. 12.

on how it is applied. As previously said, not everyone will enjoy taking part in a competitive task, although that might be a source of motivation for others. Put into the words of a famous Portuguese saying: 'You cannot please both Greeks and Trojans'.[50] Nevertheless, it is possible to try and incorporate each type of motivation, so that the maximum number of users are engaged and motivated.

Gamification is often connected to extrinsic motivation, since ranks, levels, and recognition are all part of the reward systems experienced in videogames. That is not to say that all gamification taps into this specific type of motivation. As mentioned before, gamification branches far beyond reward systems, with 'games' being created specifically for crowdsourcing projects (e.g., ESP game and Peekaboom). The task is, therefore, performed in the form of a game, with both merging into one, which, when done well, can intrinsically motivate participants. Furthermore, in videogames, it is often observed altruistic behavior between players, particularly in settings designed for collaboration, where their skills complement each other and players share the same intentions and goals.[51] In other words, they are motivated to help one another and contribute to a common goal. This may also be true with crowdsourcing since it has been observed that participants are often motivated by contributing to something bigger than themselves. Given that participants already share the same intentions and goals, it is essential to create a collaborative setting, where the community can help and complement each other. An example of this would be to create a collaborative 'gameplay' (e.g., splitting the overall work into different tasks, such as transcription and markup, so users work together towards a common goal) and/or through comment sections and chatrooms, encouraging communication between the users.

Additionally, certain elements from social games can also be applied into the promotion and marketing of a crowdsourcing project. Essentially, any product that aims to capture the public's attention requires marketing and promotion techniques in order to acquire participants, which depends on the goals and target audience. Moreover, these not only contribute to attracting participants, but to actually captivate a constant number of participants, which highlights the need for constant marketing efforts rather

[50] 'Não se pode agradar a gregos e troianos' translated by M. Silva.
[51] M. Riar and others, 'How game features give rise to altruism and collective action? Implications for cultivating cooperation by gamification', 07 January 2020, p. 697 <http://dx.doi.org/10.24251/HICSS.2020.086>.

than sporadic ones.[52] One of these methods is increasing the visibility of the project, whether that is by creating ads, through newsletters, writing a blog post or an article, participating in an interview/podcasts, or simply by posting on social media. Needless to say, not all of these examples are easy to realize (for example, coming across an interview to participate in that would consider giving the project the time and space to advertise is not easy to come by). The main point to highlight is that it is essential to find ways for the project to become visible to the target audience, whether that be merely humanities scholars or anyone that is interested. Being intertwined with social networks, rather than just using them, may also prove essential to increasing visibility. In other words, intertwining a project to a social network allows users to automatically share invitations or accomplishments through the network, consequently, attracting more people, as well as to create accounts and receive notifications through it. This feature was adapted during the development and launch of 'Waisda?', whose creators realized that linking their project to Twitter would increase the number of registered players.[53] It is also important to note that visibility can also be increased with in-person events, such as workshops or social events (such as quizzes). Besides helping to reach a broader crowd, this also contributes to building a community, since people are incentivized to not only work, but to interact with each other, which is another element that increases the chances of the project's success.[54]

In order to study whether gamification contributes to motivation, it is necessary to first clarify which elements will be focused on, as well as characterize them. It is important to note that elements such as 'gameplay' or 'full games', which are used in crowdsourcing, are not one of the main research focuses of this paper. This is due to the fact that it would require a better understanding of game design and extend past the limit of this thesis. Instead, I will focus on how reward systems (points, levels, ranks, status, medals/badges) positively affect participants' motivation and how to reduce any possible negative effects. Before doing so, it is also necessary to define what

[52] J. Oomen, R. Gligorov and M. Hildebrand, 'Waisda? : Making Videos Findable through Crowdsourced Annotations', p. 180.
[53] J. Oomen, 'Emerging Practices in the Cultural Heritage Domain-Social Tagging of Audiovisual Heritage', p. 6, <https://www.researchgate.net/publication/228585569_Emerging_Practices_in_the_Cultural_Heritage_Domain-Social_Tagging_of_Audiovisual_Heritage> (13 June 2022).
[54] M. Ridge, 'Crowdsourcing Our Cultural Heritage: Introduction', p. 2.

progression systems and competition are, as they are also elements of gamification, which are often used with reward systems.

3.3. Progression Systems

Progression systems are used to measure the progress of a user, having an individual function, and the overall progress of the project/community, adding a collective feature to a game or project. They are often used to motivate the user without establishing a competitive nature. Not only do they serve as a way for each user to observe their own personal progress, but they can also serve to show users how their contributions affected the project's progress to achieve their goals (for example, 'Transcribe Bentham' had a 'Banthamometer' which showed the project's progress). Taking into consideration the collaborative element to collective progression systems, in which users contribute by engaging with the project, the community is motivated to contribute to 'something bigger', as well as to help each other. In addition, it is possible to set up a system that rewards users for reaching pre-established milestones. So, despite the extrinsic value of progression systems, users can also be intrinsically and altruistically motivated by them.

3.4. Competition

In contrast, competition is often used to motivate participants to 'fight' for a higher rank, motivating them to either keep or better their own rank. These can be based on different aspects, such as the time during which users were active, their amount of activity, or even the quality of their outputs (this, of course, depends on the project's decision towards what will contribute to users increasing their rank). One of the most common examples of competition used with reward systems is through leaderboards. These are usually a long-term scoreboard of the users' individual performance, in which scores are compared to that of fellow participants, assigned ranks, and registered accordingly from the moment users first participate. It has been argued that this may lead to discouraging users, particularly due to it being unfair for users who join the project later on, as they cannot easily catch up with older users.[55] In order to avoid

[55] M. Ridge and others, '6. Understanding and connecting to participant motivations'.

competition from becoming harmful to the project, it is important to create a fair system. In the case of leaderboards, these would ideally reset weekly or even monthly, giving users an equal opportunity to compete without feeling 'wronged'. Another option would be to individually divide the amount of activity by the time during which users were active, although this depends on the system behind the ranking (for instance, a system which rewards players for producing high-quality data should not opt for this option).

3.5. Reward Systems

As established, reward systems are often considered an element of gamification, given that they are regularly present in videogames, having been considered the 'heart of any gaming system'.[56] However, these have also been deemed as 'the thing that is least essential to games', being as much part of games as they are part of websites and fitness apps.[57] Instead, Margaret Robertson of game design studio 'Hide&Seek', has defined these sorts of elements as 'pointsification', highlighting the need to stop fusing reward systems, such as points, levels or badges, and gamification. In this paper, I have chosen to include these sorts of systems as elements of gamification, rather than make a distinction. This is due to the fact that these can still be considered game design elements, given that they are most commonly known through their presence in videogames, which are being applied to a non-game environment, that is, a crowdsourcing project. In game studies, these sorts of elements have also been described as goal metrics, considering that they are used 'to keep track of and provide feedback on player performance.'[58] Reward systems are, therefore, constituted by elements such as points, levels/ranks, status, and/or badges/medals.

[56] G. Zichermann and C. Cunningham, 'Gamification by Design Implementing Game Mechanics in Web and Mobile Apps' (Canada: O'Reilly, 2011), p. 36.
[57] M. Robertson, 'Can't Play, Won't Play', *Kotaku*, 2011, <https://kotaku.com/cant-play-wont-play-5686393> (14 June 2022).
[58] E. D. Mekler and others, 'Do Points, Levels and Leaderboards Harm Intrinsic Motivation? An Empirical Analysis of Common Gamification Elements', *Gamification '13: Proceedings of the First International Conference on Gameful Design, Research, and Applications*, October 2013, p. 67 <https://doi.org/10.1145/2583008.2583017>.

3.5.1. Points

Points are used to keep score of the user experience, in the sense that the player is rewarded with points for completing certain tasks. Usually, they can be accumulated individually or collectively, depending on what these are keeping score of. Given their frequent presence in videogames, it is important that the different types of points used are considered. Gabe Zichermann and Christopher Cunningham have split them into five categories:[59]

1. Experience points
2. Skill points
3. Redeemable points
4. Reputation points
5. Karma points

It is also worth noting that all the different categories of points can be used together, although whether this is ideal or not depends on the game itself, or, in the case of crowdsourcing, on the project and its goals.

Experience points (XP) are a baseline for rewards, since players are awarded for anything they do. In other words, XP is given to players continuously, not having a limit or maximum of points to reach, which can be obtained simply by participating. Within the five categories, skill points can be considered the most similar, given that the points themselves are the player's reward. However, skill points are assigned to specific activities or tasks of a skill set that the player must complete in order to obtain these points (e.g., Resident Evil 6). Another type of points are the redeemable points (RP), which instead can be traded for rewards, whether that is items, medals/badges, profile headers, and more.

The two remaining categories involve interaction with other players. Reputation points are complex, in the sense that they are obtained through the completion of concrete tasks, which leads players to gain popularity and, most importantly, trust in one another. Therefore, these are often related to how many and how well these sets of tasks are completed (for instance, Rainbow Six rewards players based on their positive

[59] G. Zichermann and C. Cunningham, 'Gamification by Design Implementing Game Mechanics in Web and Mobile Apps', p. 38.

and negative actions). Similarly, karma points are also acquired through completing tasks, such as, for example, completing a daily check-in. However, these are very different in the sense that karma point's only purpose is to be given away to other players. These types of points encourage the player to share points with other players, consequently, stimulating altruistic behavior within the community.

Point Systems in Crowdsourcing

Although not always together, these different types of points have been used to gamify crowdsourcing projects. Using experience points is quite common with gamification, given that they are merely earned by participating in tasks. In fact, this leaves quite a lot of room for different takes on experience points. For example, these could be used with progression systems, being used to measure either personal and/or collective progress of the project. However, experience points can also be used to rank users accordingly, which is more commonly observed in crowdsourcing projects which use leaderboards. In short, those with more XP build up to higher rank and are, therefore, located at the top of the leaderboard. The way in which experience points are used, however, depends on the project's goals and ambitions.

Nevertheless, other types of points can also be used. For instance, a project may choose to split their work into different tasks, in order to simplify a complex task, and find it is pertinent to add skill points into the project, given that the community may be over-inclined to perform the easier task. In other words, this type of reward could balance the workload done in the different tasks, motivating users to gather different skill points by participating in all the different tasks. Another example might be using redeemable points, which allows users to buy rewards, to motivate the public to create user accounts. Given that some projects have shown users do not want to be forced to create an account, this would decrease the necessity to make user accounts mandatory.

In terms of altruistically motivating a community, it would be helpful to use karma points. These are present very often, not only in crowdsourcing, but also in social media overall. Such points, most commonly, take the form of upvotes/likes and downvotes/dislikes. Similar to experience points, these can have different purposes, varying with the tasks and goals of a project. Despite this, karma points not only offer a

chance for users' work to be recognized, but, sometimes, for users to revise each other's work. Additionally, karma points can also be used as a gifting system, where users can give virtual gifts to each other.

Finally, recognition points are also used in crowdsourcing, where participants gain status over, for example, their performance of the tasks, the number of tasks completed, and/or time spent working on the project. How users obtain status is up to those behind the project, as long as they are rewarded with recognition points. The more points a user has, the higher status they become, which may be showcased through a profile medal, color, number, and/or title. These type of points can not only motivate their users, but as mentioned before, create a sense of trust in high-status users. It does not necessarily make it a competition between whose status is higher. Instead, it may bring a community closer and, consequently, produce more engagement.

3.5.2. Levels and Ranks

Another method of gamifying a crowdsourcing project is through levels and/or ranks. Both of these systems are used to track users' performance of the tasks, given the fact that they level or rank up accordingly. Nevertheless, they are different from one another, utilizing progression systems and competition in their design. Levels are used for keeping track of an individual score, in which a user has a visual cue for their personal progress, helping them stay motivated to reach the following level. Additionally, they can also be used with a collective purpose, that is, to convey users' status.[60] In other words, users with a higher level will be considered more expert to others within the project's community. Despite their purpose, they can be obtained, as explained before, through users' performance. However, the change in level is usually accompanied by a reward, such as virtual gifts, and it is based on the number of points earned (whose type may vary according to the purpose of using levels).[61]

Ranks, however, have a competitive nature. These are visible through leaderboards, which contain the users' ranks positioned from best to worst. Users are,

[60] K. Duggan and K. Shoup, 'How Players Level Up in Gamified Systems', *Dummies*, 2016, <https://www.dummies.com/article/business-careers-money/business/general-business/how-players-level-up-in-gamified-systems-168138/> (16 June 2022).
[61] Ibid.

therefore, motivated by their desire to surpass the other members of the community, in order to be at the top of the leaderboard. Often times in video games, the players will receive extra motivation to be the highest rank (or part of the top highest ones), such as medals/badges and/or extra content/privileges (abilities, access to special deals, different items, etc.). These are adapted according to the nature of the videogame which, when adapted to a crowdsourcing project, may also apply to the task being performed. For instance, a transcription project could reward users with rarer and/or newer documents available first on a special page.

3.5.3. Status and Medals/badges

Other elements of reward systems often used are status and medals/badges. As it is possible to observe, these have been mentioned to be used with both points and levels/ranks. That is because both status and medals/badges do not work individually. In relation to status, it depends on recognition points and levels. In other words, status is built by obtaining more recognition points, which is organized in terms of levels. The more recognition points a user obtains, the higher the level of their status is. Oftentimes, levels are also associated with names, which are often showcased in each user's profile. This facilitates demonstrating users' status to each other, but also creates an opportunity for adding fun elements, such as personalized names.

Finally, medals and badges mainly serve as part of a virtual gifting system. These can be personalized depending on the project's goals, serving as extrinsic motivation for users to participate. This sort of virtual gifts can be used with levels and ranks, which means users automatically obtain them after reaching a certain goal point. However, they can also be used in the form of karma points, in the sense that it is possible to allow users to give each other medals or badges (e.g., Reddit). In doing so, it is not only helping the project understand which work and user is performing well (based on the rating of its own community), but altruistically motivating users to help each other, whether that is through ratings or feedback.

3.6. The Effect of Reward Systems

Using reward systems is not an exact science, given how dependent they are on other factors, such as the type of task and the target audience. Nevertheless, studies have shown them to motivate participants to engage more.[62] What this means is that each project must, individually, consider what reward systems to use, and how they should be adapted to the different existing factors and conditions. However, there are two conditions which can be (more or less) controlled: the level of immersion and how the use of gamification affects external, intrinsic, and altruistic motivation.

Immersion has been previously described as a state of being intensely focused on a certain task or activity. Additionally, being immersed in an activity can be intrinsically rewarding, leading to a sense of losing track of time and consciousness. When this level of complete immersion is reached, it is called achieving a state of 'flow'. Multiple conditions, which have been previously mentioned, can contribute to this state. In this section, I would like to mainly highlight two, namely the immediate feedback regarding the individual's progression and competition. Amongst other functions, progression systems, collective level systems, points, and medals/badges can give feedback to users regarding their own progress and their contributions to the project's end-goal. In giving this type of informational, positive feedback, the user knows what they are doing right, being more immersed in their activity. Furthermore, reward systems can be used as extrinsic motivation for users to give feedback to each other, whether that is through points, medals, and/or badges. That is not to say that written feedback should be overlooked. In fact, this is also encouraged, whether it is through the interface being used or through a more personal choice, such as email. Instead, the point is that gamification can, in fact, contribute to reaching a state of 'flow', although the remaining conditions also need to be present. In addition, competition in itself is an element of gamification, often observed in the use of leaderboards, which has been previously explained.

It is not possible to associate particular sets of reward systems to increase different specific types of motivation. For instance, skill points, which allow for users to track their progress in terms of experience in a particular skill, may be adapted

[62] N. Razali and others, 'Gamification Elements in Quizizz Applications: Evaluating the Impact on Intrinsic and Extrinsic Student's Motivation', *IOP Conference Series: Materials Science and Engineering*, vol. 917, 2020 <10.1088/1757-899X/917/1/012024>; E. D. Mekler and others, 'Do Points, Levels and Leaderboards Harm Intrinsic Motivation?'; R. Holley, 'Many Hands Make Light Work: Public Collaborative OCR Text Correction in Australian Historic Newspapers'.

according to a project's task and audience, being used to increase different types of motivation. However, it is safe to argue that reward systems affect motivation overall, with most tapping into extrinsic motivation, given the external factors which influence the user's motivation (e.g., medals/badges). In fact, projects within varied fields have shown that gamification is a good and fun way to extrinsically increase user engagement and motivation.[63] In contrast, whilst extrinsically motivating, it has been argued that gamification may negatively affect intrinsic motivation. In other words, the over-reliance on such elements may actually have a negative impact on their users, consequently leading to less interest in the topic or institution in the long-term.[64] In fact, video game programmer Chris Hecker has argued that this is also true in video games, although he admits that it is something players enjoy.[65] However, data has shown this not to be necessarily true, as can be observed in Mekler's and others study. It is possible to observe that the key to mediating these elements is through a 'person's perception of how these events influence the need for competence and autonomy'.[66] It is further argued that positive, informational feedback helps competence thrive, given that it is based on user's actions and its results. Hecker also suggests this as a solution to minimize the effects of gamification on intrinsic motivation (although, in his case, he still argues that intrinsic motivation will always be damaged). With this in mind, showcasing users' progression, as well as the collective progress of the project, is a good way to mediate competence within users, as it allows them to observe the desired consequences of their own actions. Additionally, informational feedback may also come from the use of point systems, particularly through the use of karma points.

[63] S. L. Alam, R. Sun and J. Campbell, 'Helping Yourself or Others?'; J. Cechanowicz and others, 'Effects of Gamification on Participation and Data Quality in a Real-World Market Research Domain', *Gamification '13: Proceedings of the First International Conference on Gameful Design, Research, and Applications*, October 2013 <https://doi.org/10.1145/2583008.2583016>; G. Barata and others, 'Improving Participation and Learning with Gamification', *Gamification '13: Proceedings of the First International Conference on Gameful Design, Research, and Applications*, October 2013 <https://doi.org/10.1145/2583008.2583010>.

[64] S. Deterding, 'Situated motivational affordances of game elements : A conceptual model', *CHI Gamification Workshop*, 2011, <https://www.researchgate.net/publication/303084050_Situated_motivational_affordances_of_game_elements_A_conceptual_model> (16 June 2022); T. Owens, 'Crowdsourcing Cultural Heritage: The Objectives Are Upside Down'.

[65] C. Hecker, 'Achievements Considered Harmful?', *Chris Hecker*, 2011, <https://www.chrishecker.com/Achievements_Considered_Harmful%3F> (17 June 2022).

[66] E. D. Mekler and others, 'Do Points, Levels and Leaderboards Harm Intrinsic Motivation?', p.67.

In relation to altruistically motivating a crowd, it has been previously mentioned that gamification can also contribute to this. Again, karma points are a viable option to create a system where users can contribute to each other's work. Additionally, other point systems may also contribute to an increase in altruistic motivation, such as experience points (e.g., rewarding users for interacting with each other). It is important to note that these alone do not constitute as a high source of altruistic motivation. In fact, other studies have shown that not only do users want to help each other, but they also want to contribute to something bigger than themselves, or simply feel as if it is a responsibility to help. This can be observed in many projects which have been mentioned before, such as 'Transcribe Bentham', 'Waisda?', and 'What's on the Menu?'.

3.7. Factors to Take into Consideration

Despite the distinction made between gamification and 'pointsification', Robertson acknowledges the importance of reward systems, highlighting that their use should be refined and adapted to different situations.[67] In other words, elements such as points, levels/leaderboards, medals and/or status depend on factors such as the nature of the task and goals of the project, and the project should adapt these elements accordingly. This does not only refer to the adaptability of the actual reward systems, but also in terms of the number of elements used, and how they interact with each other.

As mentioned before, the key to adapting elements like points, levels/leaderboards, status, and virtual medals or badges is focusing on the task at hand, as well as the end-goal of the project. Additionally, these elements of gamification should also vary with the target audience of the project, in terms of difficulty and content. As illustration, a book history crowdsourcing project with an audience that is proficient or, at least, studies this topic, should adapt their rewards to their expectations and preferences. An option would be to offer free workshops or a 'backstage pass', which could be obtained by users with higher ranks or that gathered enough redeemable points to 'buy' the reward. However, a broader audience asks for more varied rewards. That is not to say that these sorts of rewards should not be available. The point to be

[67] M. Robertson, 'Can't Play, Won't Play'.

made is that alongside those workshops and ‘backstage’ visits, there should be other types of rewards, such as user titles, avatars, accessories to personalize user’s profiles, and secret extra content, all of which could be earned through levels and ranks or ‘bought’ with redeemable points.

Not only do these elements need to be adapted themselves, but they also allow for a broad variety of ways to gamify a crowdsourcing project. This, again, depends on the nature of the task and the goals of the project itself. Nevertheless, it is important to note that there is value in these elements playing into each other. In other words, knowing how to put these elements together and use them to motivate a community can be extremely valuable. In fact, all of these can be used in one crowdsourcing project if they benefit user engagement rather than damage it.

A more extensive study on whether the adaptability to varied tasks and combination of different reward systems can increase user engagement will be explored in the next chapter. Despite the gamification elements previously described, there are still variations of combined reward systems which will also be explored, such as the creation of ‘alliances’ (which can create a sense of companionship between the community, as well as competitiveness), the use of collective progression systems (showcases the progress of the project), medals/badges and/or points for revisions/corrections, and many others.

3.8. Different Tasks, Different Systems

It is, therefore, clear that gamification and, in particular, reward systems, can contribute to the different types of motivation, as well as to the user’s immersion in the task. In other words, reward systems can contribute to a higher level of user engagement and motivation. The success of this positive contribution is, of course, dependent on how reward systems adapt to certain factors, such as the nature of the task and the target audience. Admittedly, the dependence of reward systems on other factors leads to a vague conclusion on how effective they really are. However, some aspects are important to consider when using gamification to increase user engagement and motivation:

- Reward systems must be implemented in projects whose tasks aim to be satisfying to accomplish, as this is what makes them increase motivation.

- Gamification, as well as other aspects of the project, should consider and aim to increase all different types of motivation (extrinsic, intrinsic, and altruistic).
- Much like other aspects of the project, reward systems should attend to as many user preferences as possible, depending on the target audience.
- Users should not be forced to do something, but, instead, motivated to do so.
- Reward systems should be fair and equal to every user.
- Informational, positive feedback of any shape or form should be given, as to prevent damaging intrinsic motivation and encourage immersion.

It is worth noting that, despite all the variables that may be present, some factors are impossible to erase. For example, the number of regular participants in the long term will always be low in comparison to the overall range of the project. Although the aim of gamification may be to increase participation, this does not equate to the project being unsuccessful. It does, however, mean that these regular participants should be treated as important contributors to the project's end-goal and, therefore, should also be rewarded for this. As Trevor Owens said, 'when we invite the public to contribute, we should not treat them as a crowd, and we should not attempt to source labour from them', instead treating them as 'part of the team'.[68]

As mentioned, in the next chapter I am going to be studying how reward systems may be applied to three different sets of tasks. More specifically, I will be looking at possible crowdsourcing projects with different tasks and adapting a reward system, in order to increase user engagement and motivation. Whilst these crowdsourcing projects are hypothetical and not related to existing ones, they are based on extensive research into different projects and often crowdsourced tasks. By putting together a set of tasks which has or would benefit from being crowdsourced and, subsequently, examining whether a reward system can be adapted to them, I will be contributing to the long debate of whether gamification can contribute to user engagement. Additionally, the practical examples provided next chapter may inspire future discussion into incorporating reward systems in crowdsourcing projects, and what first steps may be taken.

[68] T. Owens, 'Making Crowdsourcing Compatible with the Missions and Values of Cultural Heritage Organisations', p. 270.

It is worth noting that each reward system designed is simply a possibility between many combinations. My aim is not to create a definite answer for tasks or hypothetical projects, but to prove that it is possible that reward systems contribute to participation. Consequently, what is important is that all the factors mentioned above are accounted for, so that the chances of a successful increase in motivation are possible.

The core tasks which will be focused on are the following:

1. Transcription, correction, and markup.
2. OCR correction.
3. Contextualization and linking data.

4. Application of Reward Systems

Before thinking about gamifying any project, it is important to envision and design most aspects of the project. This includes specifying the goals, the target audience, and the methodology and instructions regarding the task itself. As mentioned before, besides the end goal, other goals need to be considered, particularly in terms of the number and quality of the contributions, the frequency of participation, and the user experience. From there, it is possible to decide on a target audience, whether it is more general or specific, which affects the remaining aspects mentioned above. Additionally, the methodology and instructions are designed according to the project's goals and target audience, particularly the tools to use, how to complete the task, and how to transmit this information to the audience. It is important to highlight again that simplifying the task at hand, although not excessively, can enhance user engagement.

Gamification elements are part of designing the methodology, including the interface. This adaptation is based on previously established aspects, but also on the nature of the task itself. In other words, whilst some tasks may benefit from a particular point or level system, these may have the opposite effect on other tasks. As part of studying the adaptability of gamification elements, specifically, reward systems, I will examine how these may apply to three different sets of tasks. Purposively, these have different characteristics, varying in terms of the number of tasks, goals, and tasks themselves.

The first set of tasks will focus on applying reward systems to transcription, correction, and markup. Rather than examining these separately, I will be stimulating how a reward system might be adapted to a project that crowdsources these three specific tasks. Given that there are generally multiple tasks in one project, it may pose a challenge to find a system that benefits all equally. Secondly, I will be studying the effects of gamification in one task, OCR correction. Whilst this may be the case, this specific case tackles other aspects, such as language barriers and/or difficulties in correction originating from the differences in writing throughout the centuries. Finally, I will address how a reward system may contribute for users to engage in tasks like linking data and contextualization, assuming there is a non-specific target audience. Both tasks contribute to gathering and connecting information. However, due to their complexity and need for prior knowledge, whilst also varying in terms of goals, they

require different priorities to be considered. Nevertheless, I intend to show that, even in this situation, gamification can contribute to increasing user engagement and motivation, including with harder tasks.

This study does not intend to provide a definitive answer for which reward system works with specific tasks. Instead, it aims to mainly explore whether reward systems can or cannot be adapted to different core tasks to increase user engagement and motivation and, consequently, contribute to the success of a crowdsourcing project.

4.1. Transcription, Correction, and Markup

The transcription of handwritten texts is commonly crowdsourced. In many cases, this allows for an increase in accessibility and, consequently, research of the text contained in the manuscripts. In addition, markup languages, such as XML or TEI, allow for these to be searchable and both human and machine-readable in terms of content and appearance of the text, which further increases research possibilities.[69] Although this complicates the tasks users must complete, it can also be done successfully, as shown in projects like 'Transcribe Bentham'. Corrections of users' transcriptions and markup by other users are also part of this 'project' since they help to maximize data reliability and quality. In order for an assortment of multiple tasks to be attractive to engage with, these must be divided, simplified, and, after completed, reviewed by project staff. Despite the fact that users correct each other's work, data will never be 100% reliable, although it does increase its quality. Projects with multiple tasks should, therefore, divide them into different sections, giving users the freedom to choose which type of task they would like to engage in, although all contribute to completing an overall end goal.

As a base, XP elements are essential, serving as a reward for 'everything' users do, from creating an account, to performing one of the tasks daily, to even commenting on other users' profiles. Furthermore, XP are adaptable, in the sense that they serve as motivation for users to do content-related things, but also, for example, to participate

[69] A. H. Renear, 'A Companion to Digital Humanities' ed. S. Schreibman, R. Siemens, J. Unsworth (Oxford: Blackwell, 2004) <http://www.digitalhumanities.org/companion/> (12 July 2022); P. Verhaar, 'Introduction to the eXtensible Markup Language', <https://bookandbyte.universiteitleiden.nl/DMT/XML/XML.pdf> (12 July 2022).

weekly (e.g., earn 100 XP for working once per week), alter their profiles, and interact with the community. This means that by completing all sorts of tasks, smaller or not, users are still rewarded with points, all of which go towards, for example, leveling up. This translates into users being inclined to return to the project, in order to obtain more points. Both intrinsic and altruistic motivation are increased by creating a sense of community, which can be intensified through specific gamification elements. For example, creating groups/alliances that users can join can create a bonding experience between the community. Additionally, it is a good opportunity to create a competitive element between groups. Instead of competition possibly creating a divergence between the community, it is used to encourage users to work together for a common goal. Rather than being ranked individually, reaching the top of the leaderboard is dependent on how many points a group acquires, based on the number and variety of tasks completed, as well as the quality of the work. This sense of community can also be intensified by creating a space for alliances to communicate with each other, as well as for users within the same alliance. Besides the altruistic motivation that this already provides, users can also be extrinsically motivated by being rewarded for being the team with the most points. Moreover, it is a great opportunity for projects to give informational feedback to each team, not singling out any members, but instead further encouraging their team spirit regarding what needs to be improved. This helps the team to stay on track with their work but also immersed in the experience.

It is important to note that these should be planned in detail, in order to prevent unfairness. For instance, having automatically generated teams or letting users choose their own teams can decrease motivation and user engagement. This is because recent members of the community may not be as experienced as older members, despite the effort they may put into the competition. Concerning this, it is helpful to have a personal level system. This way, it is possible to construct a system that puts together teams based on user levels, creating a fair and equal opportunity for all members of the community. It is also necessary to control inactive users, so those do not get put into teams. This could be done by creating a ‘sign-up’ system for users who wish to partake in the group competition, which also allows users to choose whether they would like to engage in a competitive environment, rather than forcing them to.

Besides personal level systems and group competition, skill points could also be used to motivate users to engage with all tasks. Dividing tasks contributes to a higher

level of user engagement due to simplifying a task that could be done together (transcription and markup). However, by giving users the flexibility to choose between tasks, it is a possibility that they will be tempted to simply complete the easiest tasks. Whilst any contribution is useful, this may lead to an unbalanced system, where harder tasks like markup progress slower than others. Skill points are, therefore, a viable solution to encouraging users to participate in the different tasks, since they are rewarded with points related to the task they perform. In turn, these points can contribute to a level system made particularly for each task, giving them different rewards depending on the user's work. For example, a user who participates in transcribing pages of manuscripts gets points related to their transcription skills. The more a user transcribes, the more transcription skills they earn and, consequently, the higher level they become. Whilst levels may be the reward itself, it is also possible to add extra rewards, such as redeemable points, titles (specific to their level and skills, such as 'Beginner Scribe' or 'Master Scribe'), access to extra material, and more.

When adding alliances and skill-level systems to a crowdsourcing project, it is important to consider that other elements must also be used, to prevent unfairness and increase an overall positive effect on user engagement and motivation. Likewise, it is also essential that project staff are active and doing their part of the work. This could be monetizing data quality, listening to feedback, updating the interface, etc. Despite the fact that crowdsourcing is usually motivated by a need to reduce workload and be less time-consuming, gamification can have the opposite effect if not rightly monitored and adjusted. It is, however, possible to also crowdsource a part of this work, such as quality control, much like platforms such as Discord often do with moderators. These could do work such as managing the community and analyzing whether the data is reliable.

Based on this, this combination of reward systems would increase user engagement and motivation. Not only does it ensure that users can and are encouraged to communicate, but it also allows for feedback from both staff and users to be heard. Additionally, by adjusting team making using levels, it is a fair system that benefits groups based solely on their work. By rewarding users for reaching certain levels and milestones, it extrinsically motivates them to keep leveling up, whilst remaining intrinsically and altruistically motivating due to the heavy focus on community. All of these aspects increase the possibility of high user engagement, which is, of course, also

dependent on other aspects outside of gamification, such as simple tasks, tools to facilitate a task (especially markup), intuitive interface, etc.

4.2. OCR Correction

Optical Character Recognition (OCR) is a technology used to recognize and convert print text into images.[70] Whilst in theory such technology could substitute the need for manual transcription, in practice, this is not the case. Despite providing an accuracy of above 99% when used in the right circumstances (typed characters and high-quality images), handwritten text makes OCR's recognition process difficult, decreasing its level of accuracy.[71] This is due to aspects such as unusual text styles, small handwriting, insertions and deletions, splitting and concatenation of words, abbreviations, and corrections.[72] That is not to say that OCR technology should not be used. OCR has been used in the digitization of historical text collections, as observed in institutions such as the Library of Congress and the British Newspaper Archive.[73] Despite its flaws, OCR technology is still helpful in digitizing an enormous amount of information, making it more accessible and searchable. Furthermore, much like other technologies, OCR is still in development. So, whilst it cannot substitute manual transcription and/or revision, it can, instead, work hand-in-hand with it.

This is the case with OCR correction, where a project uses OCR technology to digitize a collection, followed by a manual revision and correction. This type of task is also crowdsourced within humanities, in which the project staff handles the digitization of high-quality images of the text and the application of OCR, and the community participates in the manual revision and correction of the text. One of the most influential examples is the Australian Newspapers Digitisation Program (ANDP), which project incorporated OCR correction (or, as they called it, 'electronically translated text'), as

[70] CDS Lab, 'Optical Character Recognition (OCR)', <https://lab.library.universiteitleiden.nl/working-with-data/processing-data/ocr/> (28 June 2022).
[71] C. Dilmegani, 'Handwriting Recognition in 2022: In-depth Guide', *AI Multiple*, 4 May 2020, <https://research.aimultiple.com/handwriting-recognition/> (12 July 2022).
[72] O. Suissa, A. Elmalech, and M. Zhitomirsky-Geffet, 'Toward the Optimized Crowdsourcing Strategy for OCR Post-Correction', *Aslib Journal of Information Management*, Vol. 72, No. 2, 2020, p. 179, <https://doi.org/10.1108/AJIM-07-2019-0189>.
[73] Library of Congress, 'Chronicling America', <https://chroniclingamerica.loc.gov/> (29 June 2022); British Library, 'The British Newspaper Archive', <https://www.britishnewspaperarchive.co.uk/> (29 June 2022).

well as tagging and commenting tasks.[74] Given its relevance within the field, it is important to consider how to maximize user engagement in OCR correction.

The question is, therefore, whether reward systems could be part of the solution for motivating users in partaking in OCR correction. For instance, if a project were to use OCR technology to digitize handwritten historical documents, written in different languages, it would be useful to resort to crowdsourcing for the inevitable revising and correction process. Crowdsourcing this task to a broader crowd would also be preferable, given the multilingual factor users need to deal with. However, whilst the OCR correction does not need any prior knowledge, the content of historical nature written in different languages requires that users are somewhat knowledgeable. This includes a community with users with varied proficiency in different languages, but also knowledge in terms of abbreviations used, the typology, etc. Aside from elements which can help balance the gap between users' knowledge (e.g., a list of abbreviations, letters, common expressions), it is still impossible to force every single user to learn the necessary information, given that it is vaguely unknown. For instance, one cannot predict what has been inserted, deleted, or corrected. Additionally, learning a language is not feasible in a matter of days or weeks, takes time and effort to master. It is, however, possible to set a reward system in which users are encouraged to work with each other, in order to reach 100% completion of a page of OCR corrected text.

It is not new for transcription projects to have a progression system set up for each page of text. This not only helps to track what work has been done but also tells the users what is left and necessary to do to reach the 100% mark. For instance, the Smithsonian Institute keeps track of the progress of multiple transcription crowdsourcing projects, as well as each project's progress per page.[75] This could also be applied to OCR corrected texts, where the progress would be tracked by percentages that are visible both to staff and users. However, another possibility would be to add one more gamification element on top of such progression systems, such as collective rewards. In other words, users of different proficiencies and knowledge would be extrinsically encouraged to work together by collaborating in getting a page fully corrected. This reward could be like many others, such as points and/or medals/badges.

[74] R. Holley, 'Many Hands Make Light Work: Public Collaborative OCR Text Correction in Australian Historic Newspapers'.
[75] Smithsonian, 'Smithsonian Digital Volunteers: Transcription Center', <https://transcription.si.edu/>, (06 July 2022).

What is important is that these collective rewards outweigh the rewards obtained individually. Indeed, this does not solve the knowledge gap that may exist from having a varied community. Yet, it does allow different users to have the opportunity to work together and be compensated for doing so, including less proficient users. Moreover, it increases the sense of community and companionship between users.

In a project where the difficulty of the task varies from page to page, it is important to be clear about what the expected level of proficiency is. For example, a page with a lot of corrections is probably more complicated than one that does not contain any. Whether this is decided by computer, based on the OCR correction, or by actual people is not important, in the sense that both are flawed (although a system like the first is the better option, as it is based on statistics rather than bias). However, users must be able to give feedback on whether the difficulty of the task in terms of the content of the page is correct. This can be done through karma points, which, as said in the last chapter, often take the form of an upvote/downvote system. This sort of rating allows the project staff to adjust their settings or simply do as many adaptations as necessary, based on user preference. Additionally, setting a difficulty system also allows for higher difficulty tasks to be more heavily rewarded when completed. In turn, users would be encouraged to learn more and become more experienced, in exchange for better rewards. It is important to highlight that while this may be the case for some users, others may prefer to do easier tasks. This means that users should not be forced to learn, but instead given the choice to. At the end of the day, motivation is still relative to each user, which means that some may not be extrinsically motivated, but instead mainly intrinsically motivated. In other words, users may simply find OCR correction fun and would simply enjoy doing it, regardless of the promised rewards.

It may also be useful for users to earn reputation points. This could be through participating in higher difficulty tasks, group activities, daily corrections, reaching a certain number of corrections, and more. As described in the previous chapter, by building a reputation, users who put the most effort are compensated, as well as recognized by other users as trusty and knowledgeable, depending on their recognition level. This may be useful when users have questions or doubts regarding their correction, turning to higher reputation users for help. With tasks such as OCR correction, it can be beneficial for users to have a talking space or webpage where they can ask questions, exchange images and text, ask for and give opinions and, overall,

help each other. A reputation system would be helpful in these sorts of 'places', given that users with higher status will be able to help other users, whilst being able to prove their experience. That is not to say that only users with high reputations can answer questions, but it does create a sense of relationship comparable to the one students have with tutors. It goes without saying that a space like this, which encourages communication and allows users to express themselves, should be motivated but monitored, as it creates room for robots and spam. Equally important is to let users know the purpose of these pages, as well as that they are monitored, acting as a community 'helpdesk', rather than a private conversation space. These private spaces where the community can bond over should, nevertheless, be encouraged outside of the project's website, through groups on social media such as Facebook.

Finally, for rewards to be varied, a virtual store could be created, where users could buy virtual medals/badges and/or simply artwork to customize their profiles. Other rewards may also include access to extra content or, depending on the size of the project, rewards such as helping digitize a manuscript or working with OCR technology. The latter rewards should, naturally, be harder for users to obtain. This is due to it being more costly, but also because not every user would be interested in getting them. It is most likely that long-term, regular users will be more interested in getting these sorts of rewards, rather than non-regular users.

Regarding the aspects considered in the last chapter, this specific reward system attempts to tap into every type of motivation, creating a fun and friendly environment, whilst also creating a sense of accomplishment in getting rewarded. Given the gap that exists between user knowledge, which creates an unfair limitation for some users, elements such as progression systems and collective rewards create an altruistic environment, where users with less knowledge still have a chance to be recognized and rewarded for their efforts. By creating levels of difficulty per page, which is evaluated by the community, users get to choose whichever level they feel most comfortable participating in, which creates an enjoyable environment. Additionally, whilst users are motivated to learn more, they are not forced in doing so, still being rewarded in lower difficulty level tasks.

4.3. Contextualization and Linking Data

As mentioned, with the development of technology and the Web, it is impossible to deny that there has been a boom in information. Not only that, but accessibility has increased massively. This is extremely valuable in terms of research, contributing to interdisciplinary research, and, in general, creating more knowledge. Nevertheless, other steps can still be taken towards raising more questions and further increasing accessibility, one of which is through linking data. This allows, for instance, for researchers to explore different institutions simultaneously, collecting a larger amount of information more simply. For this to be possible, the data 'needs to be shared and connected on the Web' through persistent identifiers, 'while still being searchable by machines to index and retrieve information'.[76] These identifiers are unique, which allows for each person/object/relationship/thing to be identified and differentiated. Additionally, it is not only important for information about a specific object to be available (one of which is the persistent identifier), but also contextual information on it. This can be extremely useful, for example, in historical research. Overall, it contributes to more research and, consequently, more knowledge.

Both of these tasks can be performed by the public, although the circumstances in which they do need to be stricter. In other words, crowdsourcing these sorts of tasks can only lead to positive results if there are strict instructions for the crowd to follow. This is due to the complexity and 'freedom' of the tasks. Linking data requires a small quantity of prior knowledge concerning what persistent identifiers are, why they are important, and how to find them. In terms of contextualization, guidelines must be set to distinguish what is and what is not important contextual information. Additionally, both of these tasks have different end goals and, therefore, need to be clearly distinguished. Linking data is worth crowdsourcing since there is a lot of data that needs to be connected on the Web. Crowdsourcing this task means more people are linking data, as well as learning about the importance to do so. Contextualization, on the other hand, is not easily performed by any person, as it requires specific, extra knowledge. Its main objective is not mass production, but a search for extra knowledge, which can be obtained by reaching a broader audience.

[76] GitHub, 'LOD Tutorial', <https://unloch.github.io/lod/notebooks/Module1.html> (06 June 2022).

These aspects are important to consider, given that they provide two guidelines for creating a crowdsourcing project. For one, they highlight how essential instructions are. Secondly, and most importantly, they require a division that takes both end goals into account. In fact, this division should be extended to the reward systems, which should be created in line with the characteristics of each task. In other words, whereas contextualization is, by nature, not possible to perform by everyone, making it unfair, for example, for users to compete in a task that they are not physically able to perform, this might not be the case with linking data. Nevertheless, they can be included in the same project. Take, for example, the (in development) 'Durable Access to Book Historical Data' project, in which a big archive is being created to provide future researchers with gathered information regarding the historical Leiden book industry.[77] The goal of crowdsourcing this project is to gather more information on objects, as well as link data so that it is more findable. Although the tasks themselves have different end goals, the project aims to create a usable archive, to which both tasks contribute to this goal. Reward systems aside, it is important that instructions are detailed, clear. and easy to find, especially when there are no major restrictions in terms of audience. Whilst this may lead to more data being connected online, since gathering users is easier, it does require the project to be extra careful with guidelines, to not result in a large number of unreliable outputs. Additionally, linking data should be further facilitated through a system which produces suggestions for persistent identifiers.

It is important to focus on both tasks individually when considering creating a reward system. As mentioned, the end goal of linking data is to have more information available and connected on the Web. Ideally, it would be as easy as gathering as many people to link data as possible. However, quantity must not overshadow the importance of quality, particularly, the production of high-quality data, which is already bound to be more difficult with tasks which require extra knowledge. As mentioned, this highlights how important it is for instructions to be detailed and clear, so that every member of the community is confidently able to correctly perform the task. Alongside the suggestion system for persistent identifiers, it also helps to immerse the community by balancing the level of difficulty of the task with the level of skill, which, as explained in chapter two, contributes to users reaching a state of 'flow'. Subsequently,

[77] P. Verhaar, 'Durable Access to Book Historical Data', *Digital Scholarship Leiden*, 30th September 2019, <https://www.digitalscholarshipleiden.nl/articles/durable-access-to-book-historical-data> (13 July 2022).

this will increase user engagement and motivation in the task itself. For this reason, finding ways to use gamification to enhance users' attention to the instructions and/or tutorials available is key for user engagement. A viable option is adhering to an interactive tutorial/instructions manual, which is not in itself a gamification element, and directly 'pairing' it with a reward system, such as personalized medals/badges, XP systems, and level systems. To put it briefly, users can be rewarded for completing the different instructions, motivating them to engage with the tutorial. For instance, it is possible to create a tutorial in which users are taught about linking data, whilst being guided through the process of linking it to their corresponding persistent identifiers. At its core, it is using theory and practice simultaneously, so that users learn how to perform the task intuitively. Additionally, it makes instructions more appealing if users interact with them, rather than just read them. Finally, rather than make tutorials obligatory, it is essential that they are optional (for example, by using a turn on/ turn off system) and present on the users' screen, to remind and encourage them to participate (e.g., through a text box or a pop-up, rather than a separate folder which takes them to the tutorial).

Another aspect that must come hand-in-hand with tutorials is minimizing the possible errors expected from performing a complex task. This means that it is important for staff to be active in reviewing the community outputs, as well as interacting with them. However, it is also possible for this revision to be done by users, creating a less intensive work experience. For example, an additional task system in which users can review the work of other members of the community allows for outputs to be graded/rated, through karma points. In addition, letting multiple users link the same data also allows for a higher chance of high-quality output. Put briefly, data that has been consistently linked to a specific identifier, whilst being highly rated in terms of quality, is very likely to be correct. In terms of gamification, users should be rewarded not only for high-quality performances but also for revising other members' performances. Moreover, rewards should be distinct in some way, such as, for example, receiving titles depending on the task performed (whether it is the revision or linking data itself). This is because users will be motivated to participate in both tasks, rather than just one.

In terms of contextualization, having a large target audience can be an advantage and a curse. On the one hand, it means that a broader audience is reached, increasing the

chances of reaching the specific audience which can contribute to the project. In other words, those with the knowledge to share. On the other hand, this also means that most users will not be able to participate, creating room for that part of the community to feel that the reward system is unbalanced and one-sided. This may decrease user engagement and overall motivation, which is not solved by simply creating a reward system attached to contextualization. Additionally, it may serve as encouragement for spam or false information to be submitted as contextual information. Any individual sort of reward system should, therefore, be out of the question, as it may decrease user engagement. Nevertheless, these contributions should be accounted for by using a collective system. Rather than contributing to users' individual progress, the points accumulated for submitting veridic contextual information should go towards a collective progress system, in which all users are benefited equally. Not only does this create a fair system, but it also taps into users' altruistic and extrinsic motivation.

As observed, tasks such as linking data and contextualization benefit from using simpler reward systems than the previous examples. This is, in no doubt, related to both the nature of the tasks, which makes it imperative that some level of knowledge exists in relation to the topic, but also to the target audience chosen. Contrary to the previous examples, there is a higher focus on instructing the community and, therefore, any system which is meant to increase engagement should be simple and intuitive, to facilitate the learning process. Put briefly, rather than creating a complex reward system (e.g., alliances), it is better to also create a simple system design. Furthermore, whilst one can be 'taught', through instructions and tutorials, the other relies on specific people from a large crowd. Despite this, they still have a common goal: to gather more information for future researchers and to connect it on the Web, to make it more findable and searchable. A project like this can benefit from a collective progression system, as well as by incorporating systems with points, levels, and badges/medals in tasks related to linking data. In doing so, the use of reward systems still benefits all types of motivation. It offers extrinsic motivation through reward, encourages altruistic behavior with a collaborative progression system, and intrinsically motivates users by creating a fun experience, for example, through the intuitive and fair systems and, overall, methodology. In this case, user engagement is increased by using gamification elements to make users confident in their ability to perform a task correctly, through not only tutorials and instructions, but also by letting users correct and rate each other work.

Using a progression system also encourages users to participate, as well as possibly share the project with others, given that users will be rewarded according to the level of progression shown.

5. Conclusion

On paper, gamification offers the perfect solution for user engagement. In fact, a systematic review has shown that out of 15 studies, 12 have shown that gamification had positive significant effects on user engagement and motivation with online programs.[78] In terms of crowdsourcing, creating an interactive system which makes working into a game or, simply, rewards users for accomplishing certain tasks, therefore, may seem like a foolproof method to adapt. However, opinions on how effective gamification is in motivating a community are mixed. Some authors argue that gamification is mostly effective in the long-term, that is, in keeping a community engaged.[79] Others believe it to be hurtful overall, damaging intrinsic motivation in particular. In other words, instead of further motivating users to participate, gamification serves as a distraction from what is meant to be innately fun and, therefore, intrinsically captivating.

It is clear that this range of opinions was not based solely on speculation, as shown by the remaining three studies in Looyestyn and others' review. These did not show gamification to have significant positive effects on motivation, which might indicate that gamification is not effective in motivating users. However, it is my belief that the effects of crowdsourcing are not as predictable as one might first assume. Rather than the effectiveness of gamification depending solely on the elements of gamification themselves, it is also based on other factors. In the case of crowdsourcing, it depends mainly on the tasks being performed and the community.

In order to study how gamification, or, in this case, reward systems, affected motivation in a crowdsourcing project, three puzzle pieces were, first, necessary to define: crowdsourcing, success, and motivation. Chapter one's main focus on crowdsourcing and success factors helped clarify what factors are and are not essential for a successful project. As expected, aside from the relevance of the type of task and the methodology and user interface chosen in a project, the community was one of the most essential success factors, further highlighting its central role in crowdsourcing.

[78] J. Looyestyn and others, 'Does Gamification Increase Engagement with Online Programs? A Systematic Review', *PLoS One*, Vol. 12, No 3, 31 March 2017, p. 1, <https://doi.org/10.1371%2Fjournal.pone.0173403>.
[79] S. L. Alam, R. Sun and J. Campbell, 'Helping Yourself or Others?'.

Additionally, a list of different types of tasks usually crowdsourced was produced and its characteristics described, which was essential since, if adapted, gamification will, inevitably, depend on them.

Subsequently, chapter two's theoretical approach to motivation leads to the conclusion that different types of motivation affect users differently. In other words, users are motivated by different aspects. It also showed how reward systems may affect the different types of motivation, by being not only applied to the tasks performed, but also to other factors, such as marketing techniques. In addition, by describing the different types of reward systems and their potential in detail, it showcased the different possibilities of adaptation that these can offer. This was essential given that the effectiveness of reward systems and gamification, in general, depend on how they are combined with each other and adapted to the tasks and community at hand. Chapter three further highlighted this, in which three different, sets of tasks, which may very well constitute a crowdsourcing project, were vaguely designed, in order to analyze whether reward systems can adapt to different aspects, tasks, and goals. To help inspect this, a list of factors that contributes to user engagement was outlined.

Finally, chapter three's examination proved that it was possible to use reward systems to positively affect user engagement and motivation. As mentioned, the reward systems developed are not, in any way, meant to serve as a definite answer for the particular tasks studied. However, they did showcase that it is possible to create reward systems which have a positive effect on user engagement and motivation, as long as they are adapted to the characteristics of the project. In fact, not only can they encourage participation in normal tasks, but also lessen the effects of some of the disadvantages of crowdsourcing. This was observed, for example, in the last set of tasks examined in chapter four, where reward systems were used to motivate the community to correct each other's work and, subsequently, help create high-quality data, contributing to a successful crowdsourcing project, overall.

It is not possible to conclude that all sorts of gamification will create a successful crowdsourcing project or, even, increase user engagement. A reward system that is poorly planned will cease to succeed in motivating the community, even if the remaining project is well planned. Similarly, an adapted, well-designed reward system does not guarantee that a project will be successful, seen as the community, as central as it may be, is not the only piece of the puzzle. Nevertheless, this thesis has shown that

reward systems can, in fact, contribute to user engagement and motivation, under the right circumstances. Whilst some of the factors may be out of the project's reach (e.g., intrinsic motivation based on how interesting a task is), others can be taken into account, such as how the reward system taps into the different types of motivation, how it affects immersion, and how it adapts to the different tasks and target audience. On top of that, these should aim to offer users a choice, rather than force them to act a certain way, as well as to be fair and accomplishing.

The findings of this thesis can, therefore, serve as an indication that in order for user engagement and motivation to increase, a thoroughly planned reward system, adapted to external factors is in place. Although this topic still requires research, a few suggestions arise from this paper. Firstly, given the emphasis on the creation process of reward systems, it is worth suggesting that future projects should consider working with game designers or those with a background in game design. This is advantageous for both sides as it allows for opinions from different backgrounds and varied experiences to be combined and improved. Secondly, despite the fact that the effects of gamification are dependent on external factors, it is best for projects to develop and follow a set of 'rules', much like the ones developed in this thesis. This makes for a better experience in creating a reward system, ensuring that general factors that increase user engagement and motivation are accounted for. Finally, regardless of the project's characteristics, adapting to the community's needs and desires should be at the top of the priorities, given that they are the 'heart' of the project. This is why creating an environment where users have freedom of choice and do not feel 'wronged' or robbed of their time and effort is essential. Rather than seeing a community as a working group, they should instead be treated as people who are taking their time to help. Keeping this mindset will ensure that users feel cared for and, therefore, more enticed to return, whilst also feeling more connected to the community and project itself.

6. Bibliography

Archival/primary sources:

London, University College London (UCL) Library Services, Bentham MS Box 107_020, December 21, 1793, <https://ucl.primo.exlibrisgroup.com/permalink/44UCL_INST/5apqbq/alma9931463277404761>

Published secondary materials:

'Advantages and Disadvantages of Crowdsourcing', *Qualitest*, <https://www.qualitestgroup.com/assets/Crowdsourcing.pdf> (27 May 2022)

'Mihaly Csikszentmihalyi & Flow', *Pursuit of Happiness*, <https://www.pursuit-of-happiness.org/history-of-happiness/mihaly-csikszentmihalyi/> (18 May 2022)

'Pros and Cons of Crowdsourcing', *BohatALA*, <https://bohatala.com/pros-and-cons-of-crowdsourcing/> (27 May 2022)

'User Interface Design', *Interaction Design Foundation*, <https://www.interaction-design.org/literature/topics/ui-design> (27 May 2022)

Abuhamdeh, S. 'Investigating the "Flow" Experience: Key Conceptual and Operational Issues', *Frontiers in Psychology*, vol. 11, February 13, 2020, <https://doi.org/10.3389/fpsyg.2020.00158>

Alam, S. L., Sun, R., and Campbell, J., 'Helping Yourself or Others? Motivation Dynamics for High-Performing Volunteers in GLAM Crowdsourcing', *Australasian Journal of Information Systems*, vol. 24, 2020 <https://doi.org/10.3127/ajis.v24i0.2599>

Andro, M. and Saleh, I., 'Digital Libraries and Crowdsourcing: A Review', ed. by Szoniecky S., and Bouhaï N., *Collective Intelligence and Digital Archives: Towards Knowledge Ecosystems* (Wiley, 2017), pp. 135-162 <https://hal.archives-ouvertes.fr/hal-01436766> (27 June 2022)

Barata, G., and others, 'Improving Participation and Learning with Gamification', *Gamification '13: Proceedings of the First International Conference on*

Gameful Design, Research, and Applications, October 2013 <https://doi.org/10.1145/2583008.2583010>

Caston, D. 'Recreation Theory and Philosophy: Flow Theory', *Ferrum College Stanley Library,* <https://libguides.ferrum.edu/rec360/flowtx> (18 May 2022)

Causer, T., and Terras, M. " 'Many Hands Make Light Work. Many Hands Together Make Merry Work': Transcribe Bentham and Crowdsourcing Manuscript Collections", in *Crowdsourcing our Cultural Heritage,* ed. by Ridge, M. (Farnham: Ashgate, 2017)

Causer, T., *Transcribe Bentham*, workshop, King's College London, May 2012 <https://www.kcl.ac.uk/research/archive/arts/croud-sourcing-study/causer.pdf> (10 June 2022)

Cechanowicz, J., and others, 'Effects of Gamification on Participation and Data Quality in a Real-World Market Research Domain', *Gamification '13: Proceedings of the First International Conference on Gameful Design, Research, and Applications,* October 2013 <https://doi.org/10.1145/2583008.2583016>

Cordell, R., 'Machine Learning + Libraries: A Report on the State of the Field' (Library of Congress, 2020), <https://labs.loc.gov/static/labs/work/reports/Cordell-LOC-ML-report.pdf> (04 June 2022)

Deterding, S., and others 'From Game Design Elements to Gamefulness: Defining Gamification', *Proceedings of the 15th International Academic MindTrek Conference: Envisioning Future Media Environments,* September 2011, pp. 9-15, <https://doi.org/10.1145/2181037.2181040>

Deterding, S., 'Situated motivational affordances of game elements : A conceptual model', *CHI Gamification Workshop,* 2011 <https://www.researchgate.net/publication/303084050_Situated_motivational_affordances_of_game_elements_A_conceptual_model> (16 June 2022)

Dilmegani, C., 'Handwriting Recognition in 2022: In-depth Guide', *AI Multiple,* 4 May 2020, <https://research.aimultiple.com/handwriting-recognition/> (12 July 2022)

Duggan, K., and Shoup, K., 'How Players Level Up in Gamified Systems', *Dummies*, 2016, <https://www.dummies.com/article/business-careers-

money/business/general-business/how-players-level-up-in-gamified-systems-168138/> (16 June 2022)

Duggan, K., and Shoup, K., 'How to Identify Business Gamification Point Types', *Dummies*, 2016, <https://www.dummies.com/article/business-careers-money/business/general-business/how-to-identify-business-gamification-point-types-168137/> (16 June 2022)

Eveleigh, A. 'Crowding Out the Archivist? Locating Crowdsourcing within the Broader Landscape of Participatory Archives', in *Crowdsourcing our Cultural Heritage*, ed. by Ridge, M. (Farnham: Ashgate, 2017), p. 211-229

Ford, P., 'The Web Is a Customer Service Medium', *Ftrain.com*, 6 January 2011, <https://www.ftrain.com/wwic> (27 May 2022)

Geirland, J., 'Go With the Flow', *Wired*, September 1, 1996, <https://www.wired.com/1996/09/czik/> (18 May 2022)

Hecker, C., 'Achievements Considered Harmful?', *Chris Hecker*, 2011, <https://www.chrishecker.com/Achievements_Considered_Harmful%3F> (17 June 2022)

Hedges, M., and Dunn, S., 'How the Crowd Can Surprise Us: Humanities Crowdsourcing and the Creation of Knowledge', in *Crowdsourcing our Cultural Heritage*, ed. by Ridge, M. (Farnham: Ashgate, 2017), pp. 231-246

Hedges, M., and Dunn, S., 'Processes and products: A typology of crowdsourcing', in *Academic Crowdsourcing in the Humanities* (Elsevier, 2018), pp. 27-49, <https://doi.org/10.1016/B978-0-08-100941-3.00003-6>

Holley, R., 'Many Hands Make Light Work: Public Collaborative OCR Text Correction in Australian Historic Newspapers' (Australia: National Library of Australia, 2009)

Hosseini, M., and others, 'The four pillars of crowdsourcing: A reference model', *Proceedings of the International Conference on Research Challenges in Information Science*, vol. 1, no 12, 2014, <http://dx.doi.org/10.1109/RCIS.2014.6861072>

Huldin, M., and Norrman, F., 'The Effect of Intrinsic Game Rewards on Player Enjoyment' (Sweden: Malmö University, 2018)

Lee, K. C., 'CAPTCHA for Crowdsourcing: Prove You're Human', *Medium,* 5 November 2019, <https://kevin-c-lee26.medium.com/re-captcha-prove-that-youre-a-contributing-member-of-human-ity-b9c9090f8e8> (27 May 2022)

LeFurgy, B., 'Crowdsourcing the Civil War: Insights Interview with Nicole Saylor', *Library of Congress,* December 6, 2011, <https://blogs.loc.gov/thesignal/2011/12/crowdsourcing-the-civil-war-insights-interview-with-nicole-saylor/> (27 May 2022)

Leon, S. M., 'Build, Analyse and Generalise: Community Transcription of the Papers of the War Department and the Development of Scripto', in *Crowdsourcing our Cultural Heritage,* ed. by Ridge, M. (Farnham: Ashgate, 2017), pp. 89-111

Looyestyn, J., and others, 'Does Gamification Increase Engagement with Online Programs? A Systematic Review', *PLoS One,* Vol. 12, No 3, 31 March 2017, <https://doi.org/10.1371%2Fjournal.pone.0173403>

Masinton, A., *Archaeology Data Service Human Guinea Pigs and Casual Collaborators: Crowd Sourcing Data for Archaeology*, workshop, King's College London, May 2012, p. 2, <https://www.kcl.ac.uk/research/archive/arts/croud-sourcing-study/masinton.pdf> (21 April 2022)

McGonigal, J., 'Engagement Economy: The Future of Massively Scaled Collaboration and Participation', *Institute for the Future,* 2008, <https://www.iftf.org/uploads/media/Engagement_Economy_sm_0.pdf> (10 June 2022)

McKernan, L., 'Analysing the Past', *British Library*, 11 January 2017 <https://blogs.bl.uk/thenewsroom/2017/01/analysing-the-past.html> (28 June 2022)

Mekler, E. D., and others, 'Do Points, Levels and Leaderboards Harm Intrinsic Motivation? An Empirical Analysis of Common Gamification Elements', *Gamification '13: Proceedings of the First International Conference on Gameful Design, Research, and Applications,* October 2013 <https://doi.org/10.1145/2583008.2583017>

Mia, "The volunteer perspective on 'What makes a crowdsourcing / citizen research / online volunteering project great?'", *Collective Wisdom,* March 2021,

<https://collectivewisdomproject.org.uk/what-makes-a-crowdsourcing-project-great/> (06 June 2022)

Oomen, J., 'Emerging Practices in the Cultural Heritage Domain-Social Tagging of Audiovisual Heritage', 2010, <https://www.researchgate.net/publication/228585569_Emerging_Practices_in_the_Cultural_Heritage_Domain-Social_Tagging_of_Audiovisual_Heritage> (13 June 2022)

Oomen, J., Gligorov, R., and Hildebrand, M., 'Waisda? : Making Videos Findable through Crowdsourced Annotations', in *Crowdsourcing our Cultural Heritage*, ed. by Ridge, M. (Farnham: Ashgate, 2017)

Owens, T. 'Crowdsourcing Cultural Heritage: The Objectives Are Upside Down', *Trevor Owens*, 10 March 2012, <http://www.trevorowens.org/2012/03/crowdsourcing-cultural-heritage-the-objectives-are-upside-down/> (14 May 2022)

Owens, T., 'Making Crowdsourcing Compatible with the Missions and Values of Cultural Heritage Organisations', in *Crowdsourcing our Cultural Heritage*, ed. by Ridge, M. (Farnham: Ashgate, 2017), pp. 269-280

Philips, L. B., 'The Role of Open Authority in a Collaborative Web', in *Crowdsourcing our Cultural Heritage*, ed. by Ridge, M. (Farnham: Ashgate, 2017), pp. 247-267

Raddick, J., and others, 'Galaxy Zoo: Motivations of Citizen Scientists. Astronomy Education Review', vol. 12, no 1, 2013 <http://dx.doi.org/10.3847/AER2011021>

Rahmanian, B., and Davis, J. 'User interface design for crowdsourcing systems', *Proceedings of the Workshop on Advanced Visual Interfaces*, May 2014, <http://dx.doi.org/10.1145/2598153.2602248>

Razali, N., and others, 'Gamification Elements in Quizizz Applications: Evaluating the Impact on Intrinsic and Extrinsic Student's Motivation', *IOP Conference Series: Materials Science and Engineering*, vol. 917, 2020 <10.1088/1757-899X/917/1/012024>

Renear, A. H., ‘Text Encoding’, in *A Companion to Digital Humanities*, ed. by Schreibman, S., Siemens, R., and Unsworth, J., (Oxford: Blackwell, 2004) <http://www.digitalhumanities.org/companion/> (12 July 2022)

Riar, M., and others, ‘How game features give rise to altruism and collective action? Implications for cultivating cooperation by gamification’, 07 January 2020, <http://dx.doi.org/10.24251/HICSS.2020.086>

Ridge, M. ’Crowdsourcing Our Cultural Heritage: Introduction’, in *Crowdsourcing our Cultural Heritage* (Farnham: Ashgate, 2017), pp. 1-13

Ridge, M., ‘Citizen history and its discontents’, *Institute of Historical Research Digital History Seminar*, 2014 <https://hcommons.org/deposits/item/hc:17907/> (10 June 2022)

Ridge, M., and others, ‘6. Understanding and connecting to participant motivations’, in *The Collective Wisdom Handbook: Perspectives on Crowdsourcing in Cultural Heritage - community review version* (April 2021) <https://doi.org/10.21428/a5d7554f.1b80974b>

Robertson, M., ‘Can't Play, Won't Play’, *Kotaku*, 2011, <https://kotaku.com/cant-play-wont-play-5686393> (14 June 2022)

Strohmaier, M., Körner, C., and Kern, R., ‘Understanding why users tag: A survey of tagging motivation literature and results from an empirical study’, *Journal of Web Semantics*, Vol. 17, 2012 <https://doi.org/10.1016/j.websem.2012.09.003>

Suissa, O., Elmalech, A., and Zhitomirsky-Geffet, M., ‘Toward the Optimized Crowdsourcing Strategy for OCR Post-Correction’, *Aslib Journal of Information Management*, Vol. 72, No. 2, 2020, pp. 179-197 <https://doi.org/10.1108/AJIM-07-2019-0189>

Surowiecki, J. *The Wisdom of Words* (New York: Anchor Books, 2005), <http://www.asecib.ase.ro/mps/TheWisdomOfCrowds-JamesSurowiecki.pdf> (27 May 2022)

Terras, M., “Crowdsourcing in the Digital Humanities”, in *A New Companion to Digital Humanities*, ed. by Schreibman, S., Siemens, R., and Unsworth, J. (Wiley, 2016), p. 420 – 439

Usher, A., and others, ‘1. What is motivation and why does it matter?’, *Center on Education Policy*, 2012<https://files.eric.ed.gov/fulltext/ED532670.pdf> (06 June 2022)

Usher, A., and others, ‘Student Motivation: An Overlooked Piece of School Reform’, *Center on Education Policy*, 2012, pp. 1-12 <https://files.eric.ed.gov/fulltext/ED532666.pdf> (06 June 2022)

Verhaar, P., ‘Durable Access to Book Historical Data’, *Digital Scholarship Leiden,* 30th September 2019, <https://www.digitalscholarshipleiden.nl/articles/durable-access-to-book-historical-data> (13 July 2022)

Verhaar, P., ‘Introduction to the eXtensible Markup Language’, <https://bookandbyte.universiteitleiden.nl/DMT/XML/XML.pdf> (12 July 2022)

von Ahn, Luis, ‘Games with a Purpose’, *Invisible Computing,* pp. 96-98, <https://www.cs.cmu.edu/~biglou/ieee-gwap.pdf> (08 June 2022)

Zichermann, G., and Cunningham, C., ‘Gamification by Design Implementing Game Mechanics in Web and Mobile Apps’ (Canada: O’Reilly, 2011)

Websites consulted:

British Library, ‘The British Newspaper Archive’, <https://www.britishnewspaperarchive.co.uk/> (29 June 2022)

Cambridge Dictionary, ‘Success’, <https://dictionary.cambridge.org/pt/dicionario/ingles/success> (20 April 2022)

CDS Lab, ‘Optical Character Recognition (OCR)’, <https://lab.library.universiteitleiden.nl/working-with-data/processing-data/ocr/> (28 June 2022)

GitHub, ‘LOD Tutorial’, <https://unloch.github.io/lod/notebooks/Module1.html> (06 June 2022)

Library of Congress, ‘Chronicling America’, <https://chroniclingamerica.loc.gov/> (29 June 2022)

Library of Congress, ‘OCR Data’, <https://chroniclingamerica.loc.gov/ocr/> (28 June 2022)

Smithsonian, ‘Smithsonian Digital Volunteers: Transcription Center’, <https://transcription.si.edu/>, (06 July 2022)