universität wien

MASTERARBEIT / MASTER'S THESIS

Titel der Masterarbeit / Title of the Master's Thesis

„Best Practices for Terminology Management in Video Game Localization“

verfasst von / submitted by

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angestrebter akademischer Grad / in partial fulfilment of the requirements for the degree of

Master of Arts (MA)

Wien, 2023 / Vienna 2023

Studienkennzahl lt. Studienblatt / degree programme code as it appears on the student record sheet:	UA 070 331 378
Studienrichtung lt. Studienblatt / degree programme as it appears on the student record sheet:	Masterstudium Translation Deutsch Japanisch
Betreut von / Supervisor:	Univ-Prof. Dragos Ciobanu, PhD

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Abstract

Video games have become increasingly complex products aiming to immerse their players in the worlds presented in them, and localization has become a streamlined process within the video game industry, where today most video games are developed with an international audience in mind (O'Hagan 2020, 90). Modern video games tend to include large amounts of text that are translated in a decontextualized environment and can include a variety of game-related vocabulary that can refer both to in-game objects or places, as well as platform or hardware-related concepts (Méndez González 2019, 77–78). This setup seems to make the video game industry a likely area to employ terminology management, which helps translators to ensure the consistent use of certain words and phrases (Bowker 2015, 305). However, little research has been done on the way terms are managed during the localization process of a video game. This thesis therefore aims to provide a closer look into this topic by answering the following questions:

- RQ1: How is terminology managed in a video game localization project?
- RQ2: How do these practices compare to terminology management

The methods used for this research project include state-of-the-art literature review and interviews with professionals in the field. First of all, some terminology management practices can be inferred from best practices for localization described for example by Bernal-Merino (2015) and Chandler and Deming (2012). Secondly, these findings will be supplemented by reports written by professionals involved in video game localization projects such as the report on the localization of the Massive Multiplayer Online Role Playing Game (MMORPG) *Aion* provided by Kim (2019), as well as an interview with an experienced professional - Mathieu Donsimoni, WW Localization Technical Lead at Ubisoft Montreal - to gain more direct insights in the treatment of terminology in a major video game development company. This thesis will show that the methods used for managing terminology in the video game industry differ greatly from terminology management practices in other fields. At the same time, there is a high degree of awareness of the importance of managing terminology and there are processes in place to ensure terminological consistency.

Videospiele haben sich zu komplexen Produkten entwickelt, die es sich zum Ziel machen, ihren Spieler:innen die Möglichkeit zu geben, in die innerhalb der Spiele dargestellten Welten einzutauchen. Gleichzeitig hat sich die Lokalisierung von Videospielen zu einem optimierten

Prozess innerhalb der Videospielindustrie entwickelt, wo Spiele heutzutage mit dem Ziel eines internationalen Verkaufs entwickelt werden (O'Hagan 2020, 90). Moderne Videospieltitel enthalten oft große Textvolumen, die in einer dekontextualisierten Umgebung übersetzt werden und unterschiedlichste Vokabeln, die sich auf Gegenstände und Orte im Spiel, sowie auf plattform- oder hardwarespezifische Elemente beziehen können, enthalten (Méndez González 2019, 77–78). Dieser Umstand lässt vermuten, dass die Videospielbranche Terminologiemanagement betreibt, wodurch es Übersetzer:innen erleichtert wird, bestimmte Worte oder Phrasen einheitlich zu übersetzen (Bowker 2015, 305). Die Art und Weise, auf die innerhalb des Lokalisierungsprozesses eines Videospiels mit Terminologie umgegangen wird, ist jedoch kaum erforscht. Diese Arbeit verfolgt das Ziel, einen Überblick über Strategien des Terminologiemanagements innerhalb der Videospiellokalisierung zu geben, indem auf folgende Fragen eingegangen wird:

- F1: Wie wird während der Lokalisierung eines Videospiels Terminologiemanagement durchgeführt?
- F2: Welche Gemeinsamkeiten und Unterschiede dieser Strategien mit Theorien des Terminologiemanagements und Anwendungen innerhalb des Fachübersetzens und der Softwarelokalisierung sind erkennbar?

Die zur Beantwortung dieser Fragen herangezogenen Methoden beinhalten die Analyse relevanter Fachliteratur sowie die Durchführung von Interviews mit Experten aus der Videospielindustrie. Zunächst lassen sich aus den unter anderem von Bernal-Merino (2015) und Chandler und Deming (2012) beschriebenen Empfehlungen für die Videospiellokalisierung einige Rückschlüsse auf den Umgang mit Terminologie im Kontext von Videospiellokalisierung ziehen. Ergänzt werden diese Beschreibungen durch Berichte, die von Akteur:innen innerhalb der Videospielbranche über deren Arbeit an Lokalisierungsprojekten verfasst wurden. Ein solcher Bericht wurde von Kim (2019) über die Arbeit an der Lokalisierung des Massive Multiplayer Online Role Playing Games (MMORPG) *Aion* verfasst. Weiterhin wurde ein Interview mit Mathieu Donsimoni, WW Localization Technical Lead bei Ubisoft Montreal, durchgeführt, welches die Möglichkeit eröffnet, neue Einblicke in die Terminologiearbeit innerhalb eines großen Videospielentwicklers zu erhalten. Diese Arbeit wird aufzeigen, wie Strategien im Umgang mit Terminologie innerhalb der Videospielindustrie sich von Strategien innerhalb des Fachübersetzens und der Softwarelokalisierung unterscheiden.

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1. Introduction

Space Wars, which was developed by Steve Russel in the Massachusetts Institute of Technology (MIT) in 1962 became the first video game that was played on multiple computers within the MIT (cf. Mangiron 2017, 76). Since then, playing video games has become a popular pastime activity in modern societies and the video game industry has become a strong global economy (O'Hagan 2020, 91), valued to be a 138 billion US-Dollar market in 2018 (Slator 2019, 4). Gaming has widened beyond a pastime for individual players and the industry now also caters to a growing number of spectators of e-sports and streamers of gaming content, as well as other content creators (Slator 2019, 5). At the same time, video games themselves have become increasingly more complex products aiming to immerse their players in the worlds presented in games. This in turn makes localization an increasingly important factor within the video game industry, as games have become too complex to expect players to be able to enjoy them without understanding on-screen texts (Bernal-Merino 2015, 1).

Looking at the way in which the video game industry has developed since the 1970s, it quickly becomes apparent that video games have always been linked to efforts for globalization, making the history of video games one that is closely intertwined with that of their localization. Although the first video games that made their way into arcades during the 1970s were almost entirely mechanical, featuring simple and intuitive gameplay and not relying on on-screen text or voice files to convey a narrative to the player, their popularity alongside the development of home computer terminals led to Japanese companies entering the emerging market as one of the first countries after the USA (Bernal-Merino 2015, 158). During this period, game-related terms such as "arcade" or "joystick" were introduced into most languages with relevant video game markets. The fact that only the English alphabet could be displayed within computer code at first further contributed to the fact that English became the most common language associated with video games, with even games produced in Japan featuring English text (Bernal-Merino 2015, 159).

Nevertheless, GALA, the Globalization and Localization Association, marks the 1970s as the start of the software localization industry (Bernal-Merino 2015, 161), as game developers quickly became aware of the fact that their games could be adjusted slightly to sell better abroad (Bernal-Merino 2015, 159). What translations were deemed necessary were carried out in-house, usually by a member of the development team with some knowledge of the target language (Bernal-Merino 2015, 161). One early example of localization in the context of video games is the title of the game "パックマン" (pakkuman) which was originally translated into

English as “Puck Man” when the game was released in the USA in 1980. However, due to the initial translation closely resembling a swear word in English, the translation was changed to “Pac-Man” (Bernal-Merino 2015, 160).

During the 1980s, the home console market was established and companies like Sega, Nintendo, Atari, and Apple emerged as players in the video game industry (Bernal-Merino 2015, 162). During this decade, while in-game texts where still left in their original language, packaging and documentation accompanying the games were regularly translated into major European languages such as German, French, Spanish and Italian. These languages were subsumed into the acronym “E-FIGS” and translation into them quickly became a standard of the video game industry (Bernal-Merino 2015, 163–64). Translations were at this point still largely carried out by bilingual members of the development team, although freelance translators or bilingual players were sometimes brought on to help. Still, localization specialists did not yet exist (Bernal-Merino 2015, 164).

The 1990s brought a shift from the previously minimalist approach to translation in the video game industry to “partial localization”, a practice where in-game texts such as UI items and narrative texts are translated, but voiceover remains in the source language and is subtitled rather than fully localized (Chandler and Deming 2012, 10). While voice-recording for video games was also sometimes performed, this treatment was reserved for major titles that could be expected to sell enough copies to justify the comparatively large investment (Bernal-Merino 2015, 165). During this time, language-based interactions in the form of dialogues where players could choose one of several possible answers to influence the narrative of a game were also introduced, firmly cementing localization as a vital strategy to sell games in foreign markets. Several best practices of the video game industry, such as linguistic play testing of localized versions of a game were also developed (Bernal-Merino 2015, 166). By the end of the 1990s, revenues in the video game industry had grown dramatically and it was already becoming apparent that while there was some internal market growth within the USA, a significant portion of revenues were generated through efforts put into localization (cf. Bernal-Merino 2015, 167).

Game localization became a fixed part of the lifespan of video games during the 2000s when publishers increasingly implemented a policy of simultaneous shipment (sim-ship) of their games (Bernal-Merino 2015, 167). This policy allowed publishers to fully take advantage of their marketing campaigns (Chandler and Deming 2012, 43) while cutting down on “gray market” imports of games, which is to say providing fewer incentives for players to order the original language version of a game through a specialized retailer. Sim-ship policies also help

developers in fostering a sense of community among the fanbase of a game (Chandler and Deming 2012, 46). The success of online games, especially Massive Multiplayer Online Role Playing Games (MMORPGs) lead to dramatic changes within the video game industry and also greatly impacted the demand for video game localization. The success of this type of games led to video games becoming optimized for using internet connections to be played (Bernal-Merino 2015, 168–69). As game narratives became increasingly more complex and especially big budget titles, also referred to as Triple A or AAA titles, were fully localized, including not only their text but also voiced assets, the 2000s also saw the emergence of the first companies that specialized specifically in the localization of video games, notable examples being Gameloc, Babel Media and XLoc (Bernal-Merino 2015, 171).

The trend to fully localize a game and even make adjustments to the storyline, gameplay or specific characters continued during the 2010s (Bernal-Merino 2015, 173). Some changes to games might also be necessary in order to comply with rules set out by rating boards (Zhang 2014, 210), whose rating is often mandatory for a game to be released in a specific territory. Some prominent institutes are the Entertainment Software Ratings Board (ESRB) located in the USA, the European Game Information (PEGI) which is located in Belgium but which's ratings are applied more widely in Europe, Unterhaltungssoftware SelbstKontrolle (USK) in Germany and the Computer Entertainment Rating Organization (CERO) in Japan (Kim 2019, 20). While each of these institutions apply their ratings according to different standards, the USK for example being especially strict about depictions of violence (Chandler and Deming 2012, 47), all employ similar criteria that focus on depictions of violence and whether these are meant to seem realistic or comedic, whether characters and stories depicted are real or fictional, and the use of discriminatory or insulting language (Bernal-Merino 2015, 183). One main aim of all of these institutions is to apply the youth protection standards of their respective territory to the media they rate (Kim 2019, 20). The ratings boards are independent organizations and not part of any industry or political organs (Bernal-Merino 2015, 183).

The value of high quality localization to the players who ultimately buy the products also became increasingly apparent, with improved localizations being able to help boost the sales of a game (O'Hagan 2020, 98). When Atlus released *Persona 5 Royal*, an alternative version of their title *Persona 5*, German reviewers praised the fact that all in-game text assets had been localized from English into German as one of the most important improvements compared to the original game as well as the fact that the localized texts read "organically" and the localization made the game more accessible, no longer requiring players to have sufficient English skills to enjoy the game (Cherdchupan 2020). Similarly, sales of the game *Witcher*

which was released by the Polish publisher CD Project Red in 2007 were improved when an "Enhanced Edition" with improved translations and voiceover was released (O'Hagan 2020, 98).

On the other hand, localizations that are perceived as lackluster or of poor quality by potential players can also prompt them to choose the original version of a game rather than a localized one. While poorly localized UI-elements or storylines are obvious examples of such issues (Chandler and Deming 2012, 3), changes to cultural elements within a game can also provoke outrage among players, who seem to prefer especially elements of Japanese culture to remain in a game unaltered (cf. O'Hagan and Mangiron 2013, 331). Changes to character dialogue can also be used to avoid controversies, however, as was the case with the game *Fire Emblem Fates*, which was published by Nintendo in 2015 and prompted a social media outrage that ultimately led to the publisher altering some aspects of the localized version of the game (O'Hagan 2020, 100).

The game in question was released in Japan six months before it's overseas release and fan translators took up the task of translating the game prior to its official release, starting a "race" to prove they could translate it faster than Nintendo of America (NoA), and sparking a controversy about the "correct" way to translate a video game. While a lot of the criticisms and accusations of Nintendo "censoring" the game revolved around the removal of a "people-patting-mini-game" that was limited in the localized version to only allow players to tap on in-game characters faces (Klepek 2016), another controversy arose over a series of conversations between the male protagonist of the game and a female character named Soleil, who worries about not being perceived as "cool" by other women since she tends to become flustered around them. In an attempt to help her with this, the male protagonist puts a "magic powder" into Soleils drink which causes her to perceive men as women and women as men to help her practice talking to other women, which leads to her falling in love with the male protagonist. The conversations were leaked in a fan-translated version and sparked outrage, since they were perceived as depicting an interaction similar to gay conversion therapy (Bonds 2016). In response, NoA issued a statement clarifying that there would be "no expression which might be considered as gay conversion or drugging" in the localized version (cf. Bonds 2016), and the conversation was changed in the English version of the game, where the male protagonist offers Soleil to help her by asking her to wear a blindfold and imagine him as a woman in order to practice talking to women with him. In the end, Soleil states that she like men as well as women and would like to get to know the protagonist without imagining him as a woman (Fire Emblem Wiki n.d.). With controversies like the ones surrounding *Fire Emblem Fates* in mind, one of the

challenges faced by translators working on a video game localization project can therefore be seen as knowing their target audience and being able to judge which changes and adaptations to a game script might be necessary and which should be avoided (Dealessandri 2020).

Today, most video games are developed with an international audience already in mind (O'Hagan 2020, 90) and localization has moved on from being an "afterthought" or a "necessary evil" (Berger 2020, 154) to a streamlined process within the video game industry, where sim-ship policies are now an established standard (O'Hagan 2020, 90). In 2018, the global gaming market was valued at 138 Billion US-Dollars, with China, the USA and Japan being the countries in which the largest revenues were created (Slator 2019, 5). In terms of providers and buyers of localization services, both sides are highly consolidated with Keywords Studios being by far the biggest language service provider (LSP) specialized on video game localization and the biggest buying companies including Electronic Arts, Sony, Activision Blizzard, Ubisoft, TencentGames, Bandai Namco, Konami and Nintendo (Slator 2019, 6). While many large LSPs also offer localization services to the video game industry and many small companies have a geographic or specialized niche in the industry, only a few of these companies are offering video game localization services on a scale similar to Keywords. Similarly, many smaller independent video game developers exist and companies like Apple or Time Warner whose main focus is not on the development of video games but which do expand into this field are also listed among other video game development companies (Slator 2019, 6–7).

The video game industry will also likely emerge as one of the industries not negatively impacted by the worldwide lockdowns related to COVID-19, as gaming became one of the most popular activities during the initial lockdowns in 2020 (Clement 2022). While many video game developers struggled with the adaptation to having their staff work from home and 44% of companies reported delays in video game releases due to troubles adapting to working remotely, recording voiceover lines becoming a challenge, and shipping delays (Waber and Munyikwa 2021), the global video game market was still valued at 155,89 Billion US-Dollars in 2020. Revenues in the video game industry had already begun shifting from sales of physical copies to digital revenues such as digital versions of games and spending on digital in-game content and live services prior to the COVID-19-pandemic and these services were used to a great extend during the lockdowns (Clement 2022).

As this brief overview has shown, video games are a popular pastime activity worldwide and localization has greatly contributed to the success of the industry and continues to play an

important role therein. This makes video games and their localization a relevant and impactful subject of study within the field of Translation Studies.

1.1 Video games in translation studies

Before placing video game localization within Translation Studies, one must first clarify what a "video game" is and what "localization" encompasses. While the term "video game" is used by professionals working in the video game industry without further clarification (e.g. Slator 2019, 5) and is also widely in use in academic research concerning video games and their localization (Bernal-Merino 2015, 16), a variety of other names for describing the same phenomenon also exists (O'Hagan and Mangiron 2013, 63).

Kim (2019, 13) offers a definition of video games as "digital games that are played on a screen by using a controller such as a joystick, keyboard, or computer mouse". While this definition might seem sufficient to grasp the kind of phenomenon that is discussed, Bernal-Merino (2015, 15) points out that although the prefix "digital" emphasizes the fact that technology is required to play the games in question, thereby avoiding discussion of whether games should be distinguished depending on the hardware device they're played on, the term has not been widely adopted by the video game industry.

Instead, Bernal-Merino (2015, 15) proposes the term "multimedia interactive entertainment software", shortened to MIES, which is a descriptive term that "aims for a clear delineation of the parameters of the concept and products to which it refers". This term has the advantage of highlighting the key features that distinguish video games from other forms of entertainment. One of these features is their multimedia or multichannel nature, which is combined with their emphasis on interactivity that allows players to develop a sense of agency and involve them into the experience of the game more actively than would be the case with other forms of entertainment such as reading a book or watching movies (Bernal-Merino 2015, 16). Still, MIES is not a term that is widely in use throughout the video game industry, making it not the most suited term to discuss the phenomenon it references.

The first peer-reviewed journal dedicated to research on video games used the term "computer games" (O'Hagan and Mangiron 2013, 63), which is often used synonymously with "video game" but can also be used to distinguish "computer games" as "those [games] played with a personal computer either off-line or online" from "video games" as "[games] played on a dedicated console connected to a TV set" (cf. O'Hagan and Mangiron 2013, 64). This distinction is becoming increasingly irrelevant, however, since the line between modern game

consoles and computers is becoming increasingly blurred (O'Hagan and Mangiron 2013, 64). Instead, a distinction between "video games" as games played on a computer or console and "mobile games" as games played on a mobile device, usually a smartphone, seems to become more relevant (Slator 2019, 7).

In this analysis, the term "video game" will be used since it is, as is pointed out by multiple authors "the most common term both in the game localization sector as well as in academic writing" (e.g. O'Hagan and Mangiron 2013, 65). In order to still encompass the multichannel, interactive nature of video games, a functional definition of the term such as the one given by Bernal-Merino (2015, 18) can be used:

> *A video game is a multimedia interactive form of entertainment for one or more individuals, powered by computer hardware and software, controlled by a peripheral (a control pad, a keyboard, a mouse, a joystick, a game pad, a motion controller, a steering wheel, a video camera, etc.), and displayed on some kind of screen (a television set, an LCD or plasma monitor, or a portable display).*

This definition not only highlights the multichannel nature and interactive features that are key aspects of a video game, but also emphasizes the link between video games and software. This connection is especially useful in subsequently linking video games and localization (O'Hagan and Mangiron 2013, 65).

"Localization" is defined by GALA as "the process of adapting a product or service to a specific locale" (GALA 2020). Translation is seen as "one of several elements in the localization process" and in turn defined as "the rendering meaning from one language into another language" (GALA 2020). Furthermore, GALA (2020) specifies that "[the] purpose of translation is to convey the original intent of a message, taking into account cultural and regional differences between languages", already hinting at the problem of distinguishing localization from translation, since an adequate translation cannot be achieved by just translating word-for-word. Instead, linguistic and cultural aspects of the target region must be taken into account (Berger 2020, 157). Localization could therefore also be defined as "the process of translating between languages while providing a cultural adaptation of the product according to the needs of each different target market" (Méndez González 2019, 74). Localization is also often used as a concept for describing specifically the linguistic and cultural adaptation of digital media, such as websites, software and video games, to a target market (Kadrić, Kaindl, and Reithofer 2019, 182), which is the definition most relevant to the current analysis.

While the debate about the differentiation of localization and translation is ongoing both in the field of translation studies and within the video game industry (O'Hagan and Mangiron 2013, 104), the localization of video games is also considered as an industrial process (O'Hagan 2020, 90) that involves translating the language assets within a video game into other languages (Chandler and Deming 2012, 4). The main aim of this process is to make video games that are originally created in a specific language in a specific country available for players in other regions and within different technical, cultural and linguistic environments (O'Hagan 2020, 92). Of course, as with other forms of localization, video game development companies take on the organization of this process and invest the costs necessary to carry it out based on economic considerations (Kadrić, Kaindl, and Reithofer 2019, 183). "Monetization potential" is considered perhaps the most influential factor with regards to video game localization (Slator 2019, 4). When working on a video game localization project, just like with any other translation project, translators have to consider whether to employ a domesticating method in their translation, adapting the source material so it is perceived by recipients as though it had been written in the target language within the target culture, or whether to choose a foreignizing method, which preserves the linguistic and cultural characteristics of the source material (cf. Venuti 1995, 20). While finding a balance between these two strategies is a challenge in any translation project, fans of video games tend to prefer a more foreignizing translation style and tend to voice protest online if they perceive a game as "oversanitized" in its localized form (O'Hagan 2020, 99).

As established above, video games are a multichannel medium, meaning that they employ different sign systems to communicate at the same time (Bernal-Merino 2015, 46). Specifically, most modern video games tend to use textual, auditorial and visual sign systems to convey information to their players (Bernal-Merino 2015, 47). In this sense, video games share many similarities with other multichannel or audiovisual media such as comic books or movies and could even be considered the most complex example of an audiovisual medium (Bernal-Merino 2015, 46). Similarly, video game localization shares many key features with the localization of utility software. Among these features is the need to break a game down into translatable assets, which usually takes the form of breaking a game down into strings consisting of single words or entire lines of text (O'Hagan 2020, 93).

These similarities to audiovisual media and utility software are also emphasized within the field of translation studies, where video game localization is often presented as a combination of software localization and audiovisual translation (cf. O'Hagan 2020, 93). Audiovisual translation is still a relatively new topic within translation studies, due in part to

the relative novelty of some audiovisual products, a focus on translations of literature within translation research and a stigma surrounding mass entertainment pop-culture products, deeming them unfit as objects of study (Bernal-Merino 2015, 45). Games are similarly stigmatized, being regarded as aimed at children on the one hand (Ma 2023, 117) and potentially dangerous on the other hand, when game playing habits are routinely brought up in the context of violent crimes (O'Hagan and Mangiron 2013, 325). The stigmatization of audiovisual media as subjects of research has likely contributed to the fact that within translation studies, there is no fully satisfactory framework to encompass media phenomena of the 21st century such as webpages, audiovisual and interactive forms of media (Bernal-Merino 2015, 45).

As described previously, the first video games were made in the 1960s. Since then, the need for localization and the processes involved in achieving it have evolved alongside game technology (Mangiron 2017, 74). The first scientific paper dealing with video games was published in 1999 (Mangiron 2017, 89), followed in 2001 by the first academic conference and the publication of the first issue of *Game Studies*, the first peer-reviewed academic journal dedicated to Game Studies (Mangiron 2017, 76), which continues to be published online and focuses on "cultural and communicative aspects" of video games (Game Studies 2023). Game Studies emerged as an interdisciplinary domain, in which video games are analyzed from various perspectives such as sociology, psychology, narratology, and media studies, but localization practices are not a large focus within the field (Mangiron 2017, 76).

Similarly, localization made its way into translation studies mainly in applied areas such as the training of translators and the technical aids they use for their work (O'Hagan and Mangiron 2013, 98), with the first article specifically on game localization published in 2002 dealing with the main features of this type of translation (Mangiron 2017, 76). During the mid-2000s, translation scholars began to analyze this new phenomenon more in-depth, with the first monograph on game localization being published in 2005 by Chandler, a professional working in the video game industry, who provided an overview of guidelines for video game localization (Mangiron 2017, 75–77). During the 2000s, research on video game localization focused primarily on the specific features of video game localization, as well as the text types present in a game, the creative process of localization, and comparisons of video games to other types of media such as children's literature. The phenomenon of fan translations of video games, also referred to as rom-hacking became a point of focus as well (Mangiron 2017, 77–78).

In 2010, the *Fun for All: International Conference on Video Game Translation and Accessibility* Conference was organized by the TransMedia Catalonia research group at the Universitat Autònoma de Barcelona for the first time. The conference continued to be hosted

by the same institution every two years until 2018, becoming a "meeting point for academic and professionals working in the game industry and the game localisation industry, as well as students and translators interested in this field". After a break, presumably due to the COVID-19 pandemic, the 6th edition of the *Fun for All* Conference took place in February 2023 (Universitat Autònoma de Barcelona 2023).

The 2010s also saw the first PhDs on game localization awarded to Pérez Fernández in 2010 and Méndez González in 2012, while articles on video game localization were published in journals and magazines related to translation studies and the video game industry. The main focus of research continued to be on the unique features and challenges of video game localization (Mangiron 2017, 80). Video game localization was situated within the field of translation studies as a translation practice closely related to technological developments (O'Hagan and Mangiron 2013, 105), with most of the research carried out on this topic focusing on empirical evaluations (Mangiron 2017, 82). While research into the concept of video game localization has also been carried out, most notably by O'Hagan and Mangiron (2013) and Bernal-Merino (2015), the vast majority of research in the field remains descriptive, with qualitative analysis focusing on observing and describing processes or phenomena related to video game localization (Mangiron 2017, 82). Research topics tend to focus on the relationship of video game localization and other forms of translation, mainly the translation of audiovisual media and software localization, as well as different text types included in a video game. As in other areas of translation studies, descriptive research regarding the translation strategies employed has been carried out, and cultural adaptation during the localization process, and the translation of specific aspects of a game such as humor have also been studied (Mangiron 2017, 83).

The focus of research on game localization has broadened since the beginning of research in this field. While early research focused primarily on describing the phenomenon and identifying agents and challenges involved in the process (Mangiron 2017, 82), more recent research topics have also included fan translations, as well as research on pedagogical and training issues, aiming to identify the skills required for a translator to work in the field (Mangiron 2017, 83). Most research done on video game localization continues to be empirical, employing qualitative methods to either analyze an author's personal experience working in the field, or on textual analysis and case studies aiming to analyze a specific aspect of the localization process (Mangiron 2017, 84). Experimental research still seems to be uncommon (Mangiron 2017, 85) and even though corpus-based analysis of localized video games have not been carried out in the field of translation studies (Mangiron 2017, 88), a method to create a

corpus based on video games has been devised by Ma (2023) with the aim of analyzing the use of language in a given game. This method, which consists of taking screenshots of instances of text appearing on the screen while playing a game and converting these screenshots into a machine-readable format using Optical Character Recognition-technology (OCR) (Ma 2023, 119) might not be feasible for newer games, which contain much larger amounts of texts than the game converted this way by Ma, which was published in 1996 (Ma 2023, 118). Nevertheless, the method might still prove useful to partially solve the issue of researchers not being able to obtain usable material directly from publishers due to non-disclosure agreements preventing the sharing of development material that is brought up by Mangiron (2017, 86) as one of the factors hindering research in the field.

Regarding the topic of this analysis, the use of terminology in the video game industry, as well as in video games has been studied to a small extent. Bakos (2018) used new players of World of Warcraft as a means to study the acquisition of video game-related jargon, focusing on how a new player adapts to the linguistic conventions of the community of a game. Méndez González (2019) more specifically observed the use of specialized terminology in the video game industry, classifying neologisms used in the field and showing that several areas of both game- and technology-related terms have to be understood by professionals working in the industry, as well as translators and interpreters working on video games or at industry-related events. Terminology management on the other hand does not appear to have been a focus of research regarding video game localization, a notable exception being an article published by Zhang (2014) in which potential benefits of implementing terminology management in video game localization projects are discussed and a potential setup for integrating terminology management into the localization process is proposed. Moreover, Zhang (2014) makes an argument for pooling resources towards creating a freely accessible online terminology database for the video game industry in order to facilitate standardization of terminology in the field and create a resource for both translators and researchers. Despite “glossaries” being regularly brought up as an important part of reference material developers are advised to share with their translators to allow them to produce translations of high-quality (Chandler and Deming 2012, 156), the way in which these glossaries are created, maintained and turned into resources for the localization process has not been a topic of research.

1.2 The video game localization process

As discussed above, a video game is a complex multimedia product that includes a large variety of different assets utilizing different file types (Bernal-Merino 2015, 190). The assets associated with a video game can be separated into in-game assets and marketing assets (Slator 2019, 12), with in-game textual assets usually making up the largest bulk of work (Chandler and Deming 2012, 144). While most textual in-game assets consist of user interface strings, subtitles for movie scenes and dialogue texts, they can also include other information that players can access by interacting with the game world, such as text contained within books, displayed on signs or offered as an on-screen tutorial or on a loadings or help screen (Slator 2019, 12). Additionally, voiceover files will need to be translated and recordings need to be created for each target language, which is the most expensive and time-consuming aspect of video game localization (Chandler and Deming 2012, 144). Lastly, many games contain some forms of art assets such as billboards or posters which might be translated (Chandler and Deming 2012, 145) or might need to be adjusted to the target market in some other form to avoid coming across as offensive (Slator 2019, 12). Marketing assets usually include assets relating to packaging material, official websites for individual games and other promotional articles, as well as merchandise. Once a game has been released, the localization team is also often brought back to localize patches fixing existing bugs or larger game updates featuring, for example, additional chapters, features or characters (Bernal-Merino 2015, 108).

The amount of text included in a game will vary depending on its genre (Chandler and Deming 2012, 144). The source language version of a large game can include up to a million words (MD, 105), which usually get translated into not one, but several languages, and additional technical modifications might need to be implemented for the game to run on different platforms (Bernal-Merino 2015, 107). These modifications can also be reflected in content that needs to be translated. In a game released both on the PlayStation 5 and the Nintendo Switch, for example, an instruction for a player to press a specific button would need to be worded differently depending on the console, since the controllers for these two consoles use different labels for their buttons. For example, the button a player needs to press to return to the console's home menu is referred to as the "PS Button" for the PlayStation (Playstation.net 2023), whereas the Nintendo Switch calls it the "HOME Button" (Nintendo Costumer Support n.d.). Similarly, the Nintendo Switch uses the letters "A", "B", "X" and "Y" to refer to a cluster of four buttons that are often used to interact with a game in various ways (Nintendo Costumer Support n.d.), while these buttons are labeled with a circle, a triangle, a square and an "X"-shape on the PlayStation Controller (Playstation.net 2023).

Localization into the E-FIGS languages used to be the minimum standard at the start of the 2000s. Since then, however, it has become more common for companies to localize their games into at least eight to ten languages to cover all continents (Bernal-Merino 2015, 80). Even smaller game companies appear to make efforts to translate their games into several languages, as can be exemplified by an effort by the small development studio Supergiant games which aims to localize their upcoming title *Hades II* into 13 languages, including FIGS as well as, among others, Brazilian Portuguese, Ukrainian and both traditional and simplified Chinese. It is stated that the final game might include even more languages (Supergiant Games 2022).

Although the localized texts will be presented in various ways within the final version of the game, texts are usually converted into Microsoft Office formats, with Word and Excel files being frequently used to send out texts to localization vendors (Bernal-Merino 2015, 203). While these formats are very versatile and allow localization vendors to work with translation tools also employed in the translation of technical and scientific texts to increase translation productivity and consistency, the file formats were designed for word processing and bookkeeping (Bernal-Merino 2015, 203), and using them for the translation of multimedia interactive products leads to some issues in the localization which will be explained in greater detail in section 1.3.

In order to manage the localization of a video game efficiently, a necessary requirement to ensure sim-ship delivery, which, as laid out above, has become a standard practice in the video game industry, concrete plans for which languages a game should be localized into should be made at least six months before the expected release (Chandler and Deming 2012, 52). Moreover, creating a source version that is properly internationalized, meaning it can be adapted to fit the needs of different territories such as different reading directions and formats for calendric dates, helps to ensure a smoother subsequent localization project (Chandler and Deming 2012, 4). Behrens (2016, 16:21) emphasizes that the internationalization of, in his case, utility software, must include ensuring that the textual elements of the software can be altered without altering the actual code of the software. Such considerations must be part of the internationalization of video games in order for the localization step to be able to exclusively focus on altering the linguistic assets of a given game (Chandler and Deming 2012, 8). This necessitates the integration of localization-aware procedures into the game development process, which is a complex process in its own right (Bernal-Merino 2015, 177). One way to achieve this can be the integration of localization staff into the development team, giving

localization professionals a chance to be involved in the development process and advise about localization issues, so that they can be addressed during game development (MD 9-18).

Another decision that should be made as early as possible during the localization process is the extent of localization, also referred to as the *level of localization* (Chandler and Deming 2012, 51). Chandler and Deming (2012, 8–10) differentiate between four levels of localization, the first of which is called "No localization" and, as the name suggests, entails that no localization occurs and a game is shipped in its original language version into foreign markets, as well. This level of localization is the least demanding in terms of resources and time investments needed, and is usually done for games with small budgets, or for regions where a game is not expected to sell many copies (Chandler and Deming 2012, 8–9).

At the second level, "Box and Docs Localization", the game software itself is not localized, but the game is shipped with localized packaging and documentation material (Chandler and Deming 2012, 9).

The third level is titled "Partial Localization" and describes a localization effort in which all in-game texts are localized but the voiceover content remains in the original language. Compared to the first two levels, partial localization requires a much larger investment of time and other resources, since the localized text assets need to be implemented into the game and their implementation needs to be tested (Chandler and Deming 2012, 9–10).

Finally, the highest level of localization or "Full Localization" describes instances where all assets associated with a game are localized, including translating and recording voiceover for each language full localization is performed for. This level of localization is the costliest form of localization and is only performed for games with large budgets and for huge markets. It also requires even more careful planning than the other levels of localization, since performing voice recordings means that changes to text and voiceover scripts become impossible in late stages of the localization process (Chandler and Deming 2012, 10).

While there is no precise definition of different types of games or when a game is considered to have a "huge budget", a common differentiation in the industry is between AAA, AA and Indie titles. AAA games are developed by large development studios and, while no precise borders exist, they are generally associated with having the high budgets, being complex in terms of gameplay and narratives, and selling very well (Coleman et al. 2023, 40). Development budgets for AAA games have expanded massively over the past few years. While in the late 2010s the average development budget for an AAA game ranged between $50-150 million, games expected to release in 2024-2025 have been reported to have budgets of $200 million or more. The budget appears to be even higher for titles associated with franchises, with

publishers reporting development costs ranging from around $300 million up to $660 million, excluding marketing budgets (Coleman et al. 2023, 309–10).

AA games on the other hand are also developed by large development teams often spread out over multiple offices but do not reach the budgeting-scales of AAA games and don't have the same reach in terms of their sales (Coleman et al. 2023, 40). The budget for an AA game can vary considerably, ranging from budgets similar to that of Indie games up to similar budgets to AAA games (Karthikeyan 2022).

Finally, Indie games are typically developed by smaller companies that work *independently* from larger parent companies. Studios developing Indie games often rely on crowdfunding or donations to fund their games (Coleman et al. 2023, 40) and budgets can range from around $50,000 to $700,000 up to $10 million for Indie games that are developed by larger teams, sometimes involving members with experience working on AAA games (Guru Staff 2022).

The localization process itself can be broken down into three main phases (Chandler and Deming 2012, 10). During the *planning phase*, the core aspects of the localization project need to be established. This includes not only decisions about the target language and the level of localization to be applied for each language, but also familiarizing the localization staff with the gameplay design, user interface design, and the asset organization within the game code. Localization staff often work with the sales and marketing department to decide on target languages and regions, often taking data from past international sales into account (Chandler and Deming 2012, 11). Workflows for carrying out the localization also need to be planned so no assets are forgotten during the localization process (Bernal-Merino 2015, 108). Most video game developers outsource a substantial amount of their localization work to external vendors (Slator 2019, 13) who are often located in the target countries (MD 83) to ensure that the target language version produced reflects the actual state of the language that is currently spoken in the target country or region (MD 86-88). In order for vendors to be able to schedule a localization project, they must be informed about core parameters of the project by the developing company. In addition to parameters needed for any translation project, such as the source and target languages, and the number of words that need translation, as well as the delivery date for the translations, these core aspects include the name of the project, information about how to contact the developer and who to contact, the platforms the game is to be released on, and the planned release date of the game (Chandler and Deming 2012, 149–50).

Once the planning phase has been concluded, the localization project can proceed to the *main phase*, during which the localized versions of the game are created by translating,

integrating, and testing the localized version as efficiently as possible (Chandler and Deming 2012, 11). Since the actual localization workflow depends not only on the size of the game and the workflow practices at the developing company, but can also vary depending on the specific localization vendors a company works with and the target languages (O'Hagan 2020, 93), there needs to be a person who manages and keeps track of all aspects of the localization process. This person will function as the main point of contact for localization-related issues (Chandler and Deming 2012, 86). Since changes to the source language version of the game are often made during the writing process (Chandler and Deming 2012, 143), such changes must be communicated to all localization vendors as efficiently as possible. In localization projects for larger games, assets are usually frozen, meaning editing them for any purpose other than bug-fixing is avoided after a certain point, and sent out for localization in batches. Deadlines for such asset freezes must also be communicated among the writing, as well as the localization teams (Chandler and Deming 2012, 71), since changes made to assets that are already localized can create a need for pick-up translations that might even result in audio recordings needing to be redone in case of working with full localization as the goal (Bernal-Merino 2015, 181).

In the final step of the localization process, which Chandler and Deming (2012, 12) call the *post-production phase*, the localized version of the game is finalized and other assets such as packaging and user manuals are localized. In a sim-ship setup, this step will likely occur around the same time the original language version of the game is also mastered, meaning a final build of the game that has been approved by console manufacturers gets locked down and prepared for distribution (Bernal-Merino 2015, 180).

1.3 Issues in video game translation

Many of the issues commonly cited by translators working in the field of video game localization can be explained by the close connection between the game and development processes described in section 1.2 and the sim-ship policy employed by most game developers. It is common for several translators to be assigned to work on the same batch of assets a vendor received for localization, making it challenging to maintain a consistent style of writing while the workload for each individual translator can still be quite high (Kim 2019, 91–92). Issues can also arise due to inconsistencies in the English source text which might arise due to changes being made to the concept or storyline of a game during the development process (MD 57-59). Just like with the localization of utility software, challenges for translators can also be caused by oversights being made in the internationalization of a game (Behrens 2016, 16:21), leading

among other things to character limitations for some strings that might not be feasible for some languages and result in texts being shortened or unusual abbreviations of words being created (Kim 2019, 92). Another set of issues that can be linked to the development process of video games arises from the common use of English as a pivot language in the localization process. While a lot of games are written directly in English, for games where this is not the case a translation into English is usually created first and then used as a basis for translations into other languages. This is meant to allow for smoother proceedings when presenting the game internationally (MD 34-38). Since English is the language that is used as an official language in more countries than any other language (BDÜ 2017, 8), likely making qualified translators working from English more readily available than translators working from Japanese or Korean, this strategy is understandable. Still, the use of a pivot language creates an additional layer of changes being made during translations, as many contents might already have been adapted for an English-speaking audience before they get translated into other languages. Further adaptations might be made for the new target audience, as well.[1] This robs a translator of some of their power to determine what changes might be needed to fit their target market, as they often have no way of knowing what changes were already made by the English translator (Sanz Lòpez 2013, 92–93).

Another area of difficulty arises from the great variety of assets contained in any video game. While the largest group of assets will usually be made up of in-game texts, these can already cover a wide variety of genres and themes (Chandler and Deming 2012, 144). In addition, subtitles might have to be created, scripts translated for recording if a full localization is to be performed, and everything from art assets to pop-ups and error messages to manuals needs to be translated (Chandler and Deming 2012, 144–47). Games also contain legal documents such as End User License Agreements (EULA) and guarantee files (Bernal-Merino 2015, 136). All of these assets cover a wide variety of text types that include narrative texts, technical texts, didactical texts teaching players how to play the game, as well as promotional material and legal texts (Bernal-Merino 2015, 109). Each of these text types comes with its own set of requirements regarding its style and the specific knowledge required by a translator to produce an adequate translation (O'Hagan 2020, 94), which makes judging the needs of each

[1] When games are written in English, language variations such as a differentiation between British and American English might be used to match a games setting (MD 71-75). A more in-depth look at the types of English spoken both by characters in video games as well as by players interacting in the context of a video game is provided by Iaia (2016).

new translation batch they receive, and deciding when to employ which translation strategy, one of the core challenges for video game translators (Chandler and Deming 2012, 108).

These difficulties are amplified by the fact that the video game industry is one of if not the most terminologically-complex field in the entertainment industry (Méndez González 2019, 78). Neologisms are often created for different purposes within a game as a part of the game's universe or story, but many terms are also derived from technologies used to create video games (Méndez González 2019, 83), or they are created for a new generation of video game consoles (Méndez González 2019, 79). The different types of terminology included in a game, as well as strategies employed to manage them within the video game localization process will be discussed in greater detail in later chapters, but the fact that many of the terms created for a video game are not part of general language and often can't be found in a dictionary creates challenges for a video game translator that might not be present in the same way for translators working in another specialized field (Kim 2019, 53).

Perhaps the greatest challenge faced by video game translators is the fact that they don't see the texts they translate in the actual context they are written to appear in (MD-146-148). Most assets in a game are extracted into spreadsheets and sent out to translators in that form (Bernal-Merino 2015, 77), which bears no resemblance to the multimedia interactive environment the texts are meant to be used in (Bernal-Merino 2015, 81). A similar problem of decontextualization is faced during the localization of websites and utility software. However, tools such as SDL Passolo or Visual Localize exist to offer translators a "What you see is what you get" (WYSIWYG)-view of the strings they are working on, minimalizing the impact of having to work on decontextualized strings (Bernal-Merino 2015, 196). These tools are, however, not compatible with the coding used in video game development (Bernal-Merino 2015, 81). Game developers therefore sometimes opt to create proprietary localization platforms or use tools that are widely used in the translation industry, such as memoQ, XTM or products made by SDL (Slator 2019, 12). These ComputerAssisted Translation tools (CAT-tools) were specifically designed to help translators with their work and support translation memory technology (Chandler and Deming 2012, 188), which allows translators to easily access translations they already created, helping to increase their efficiency (Reinke 2013, 27). Developing a tool that allows translators working on a video game to benefit from a WYSIWYG style work environment remains one of the areas of game localization with need for new innovations (Bernal-Merino 2015, 174).

Another challenge faced by translators during video game localization is the fact that texts might contain variables for different aspects of the game such as a player character's state

or a number of an object (Kim 2019, 55) and will likely not appear in the order they might appear in in a game (Kim 2019, 113). Due to a player's ability to input bits of text themselves and thus influence the flow of dialogue within the game, text strings might appear in different orders for each players and some bits of text might not be displayed at all depending on the players' input (Kim 2019, 119). While game companies aim to mitigate the effects of this translation setup by giving their translators as much information about a game as possible (Chandler and Deming 2012, 109), the setup can still result in contradictions between the textual, visual, and auditorial aspects of a game (Bernal-Merino 2015, 47). This in turn makes testing of the localized version a vital part of the localization process since the testers can see the game-text in its in-game context (MD 146-147) and are therefore able to spot localization mistakes in the localized game so they can be corrected before the game is released (MD 148).

1.4 The study of terminology

Apart from video games, another field that will be relevant to this analysis is "terminology", which can refer to either the scientific discipline of terminology studies, a collection of terms or the management of such a collection (Warburton 2015, 261). As a scientific field, terminology science is closely linked to the study of specialized languages (Oeser and Budin 1999, 2179), where the principles of how terms in specific specialized areas are formed have been debated starting in the 19th century. In the 20th century, terminology science emerged as an independent field of study due to efforts to create more general terminology standards (Oeser and Budin 1999, 2171). While terminology science is sometimes still defined as "the study of technical and scientific vocabularies" the actual focus of the discipline has shifted towards technical and scientific discourses because discourses are where terms are created (Depecker 2015, 35). Another important feature of terminology science is its interdisciplinarity. Terminology science can be seen as an intersection of information science, science theory and the study of specialized languages (cf. Oeser and Budin 1999, 2179) and many contributions to terminology science have not come from linguists specializing in specialized languages, but from experts in other fields, such as information science or translation science (Oeser and Budin 1999, 2179–80).

When referring to a collection of terms, on the other hand, "terminology" can be defined as the sum total of all specialized vocabulary within a specialized field (Drewer and Schmitz 2017, 5–6). Lastly, when defined as the management of a set of terminology, "terminology" describes the process of capturing, processing, updating and the preparation for use of

terminological data (Steurs, De Watcher, and De Malsche 2015, 222). The focus of this thesis will be on terminology management, for which the distinction between "terminology" as a set of specialized vocabulary and "terminology" as a synonym for terminology management is vital. In order to avoid confusion, the word "terminology" will be used exclusively to refer to a set of specialized vocabulary, whereas terminology management and terminology science will be specified as such.

1.5 Types of terminology in a video game

As discussed at in section 1.3, terminology is one of the areas of video game localization that can cause issues during the localization process. This is partly due to the fact that, in addition to the issues laid out in section 1.3, no two video games will be exactly the same with regards to terminology, presenting a unique set of challenges (Méndez González 2019, 72). Moreover, the video game industry continuously develops new technologies, which bring new concepts and terms with them (Zhang 2014, 201). Méndez González (2019) conducted a study in which he analyzed 300 games published between 2006 and 2018 on "seventh generation video game consoles", as well as game industry events available online (Méndez González 2019, 73) and identified three main different kinds of specialized terminology relevant to the video game industry and, by extension, the video game localization process (Méndez González 2019, 77).

According to Méndez González (2019, 77) the first area of specialized terminology relevant to video game localization can be titled "Terminology of the Platform". This category includes terminology relating to mandates given out by hardware developers in the video game industry, as well as non-game-specific hardware systems such as smartphones or web-browsers. While many hardware-related terms might be shared among different platforms, they can have developer-specific translations in different languages (Méndez González 2019, 77).

The second, and perhaps biggest, category proposed by Méndez González (2019, 77) is titled "Game Terminology". Not to be confused with the more hardware- and user interface-specific terminology of the first category, this one includes terminology related to the specific video game software. It includes terms related to skills, characters, weapons, vehicles and anything else a player might encounter in the world of a video game (Méndez González 2019, 77). Many of these terms might be fictitious, requiring translators to either come up with an entirely new translation for a term (Kim 2019, 95) or use a translation established for a previous entry if a game is part of a franchise (Méndez González 2019, 77). However, video games might

also be developed based on existing works, such as novels or movies (Kim 2019, 81), or make references to real-world myths (Kim 2019, 87).

When dealing with specific "video game language" the amount of game-specific terms and the extent to which they are used varies depending on a game's genre and general volume of content, with MMORPGs being the genre that makes the most extensive use of such language (Kim 2019, 108). They are closely followed, however, by other genres with a heavy focus on narrative content such as RPGs that also heavily rely on in-game text to convey information to their players (Ma 2023, 118). Regarding the terms used to refer to fictional elements within the setting of a game, Méndez González classifies three types of neologisms commonly found within video games in addition to common types of neologisms found in other environments (Méndez González 2019, 81–82). These can be classified as "New species neologisms", "Weapon and skill-related neologisms" and "Item related neologisms". "New species neologisms" are used to name a variety of species within a game world. While most species in games bear completely fictional names, such as the "Heartless" found in the game series *Kingdom Hearts*, some species might have names with real world equivalent such as the "Spartans" in *Halo*, making it even more crucial that translators understand the source material perfectly to avoid confusion. Weapons and skills are also an important part of the setting and gameplay of many video games, and while many of them might bear similarities to real-world weapons, there is again a huge section of weapons and abilities with unique names such as "Keyblade", "Jagdplaute", or "Plasmid". Especially in long-running series, inconsistencies in the translation of skill- or weapon names can lead to confusion among players and create situations where two skills from two different games appear to be different skills in localized versions, when they are the same skill in the source language (Méndez González 2019, 82). Finally, "item related neologisms" can name anything from a "mushroom" as found in the *Super Mario Bros.* series (Méndez González 2019, 82), to magical artifacts, potions or food items (Sanz Lòpez 2013, 85).

If an item, place, or creature has a purely fictional name, such as "Bahamut" from the Final Fantasy series, this name can usually stay the same across all languages (Sanz Lòpez 2013, 85), though it might need to be transcribed from Japanese or Korean, depending on the source language of the game (Kim 2019, 78). In other cases, the name might be translated by either keeping the elements of the original name and translating them (Sanz Lòpez 2013, 69), as is the case with the "Keyblade" mentioned above, which became a "Schlüsselschwert" in the German version of the game (Heaney 2022), or by coming up with an entirely new name (Sanz Lòpez 2013, 69). The decision of how to translate a name is not always up to the translator (Sanz

Lòpez 2013, 70), as the developer might decide to keep certain terms in the original language, use existing translations from previous entries in a series, or avoid certain translations to avoid copyright issues (MD 97-102). Another aspect that might contribute to the decision of how to translate a given name is the fact that English terms related to video games such as “buff” are understood by players and often remain in English as a result (Kim 2019, 57).

In addition to partly or entirely fictional worlds, the scenario of a video game, defined by Kim (2019, 44) as “the sum total of all circumstances the game is set in and involves, including the setting of the video game world, the storyline, characters and their relationships to one another etc.”, can involve anything from the recreation of historical events, such as World War II, to the experience of driving around in a luxurious car. This creates a need to consider large amounts of specialized terminology that varies greatly for each individual game (Méndez González 2019, 72).

Finally, the last category of specialized vocabulary in video games according to Méndez Gonzaléz (2019, 77–78) covers “Industry terminology” and contains terms that are related to press releases, marketing texts, and other industry specific information such as the names of studios, events and technologies used to make a game.

Zhang (2014, 211) proposes a similar differentiation between technology-specific and genre-specific terms, as well as terms for individual games when collecting terms in the context of a video game localization project to avoid ending up with an impractically large terminology resource. Technology-specific terms would encompass terms used in the context of specific hardware or operating systems, such as terms used by prominent hardware developers. Genre-specific terms would include terms that are commonly used in specific gernes of video games, and terms for individual games would include all terminology in a given game that requires special attention during the translation process (Zhang 2014, 211–12). Additionally, Zhang (2014, 212) suggests creating a glossary of terms which are affected by space limitations.

2. Research questions

As the previous chapter has shown, video game localization is a complex process which involves many actors both from within the video game industry and the language industry. Regardless, localization is a vital part of the game industry, and the localization process is expected to yield results of high quality for large volumes of text within tight deadlines. These characteristics are in no way exclusive to game localization, but can be considered a common trait of all translation projects[2], and several technologies and strategies have evolved to help translators meet these demands.

One such method, which is often employed within specialized translation projects, is terminology management, which helps both source language authors and translators to ensure the consistent use of certain words and phrases in order to produce a text that is easier to understand for its readers (Bowker 2015, 305). Modern video games tend to include large amounts of texts that are translated in a decontextualized environment, and translators must keep track of a variety of game-related vocabulary that can refer both to in-game objects or places, as well as platform or hardware-related concepts (Méndez González 2019, 77–78). Zhang (2014, 198) points out that terminology management could be a vital strategy to help translators cope with the terminological challenges posed by video game localization. However, as laid out in section 1.1, little research has been done on the way terms are managed during the localization process of a video game. While industry reports tend to mention the necessity for video game writers to create glossaries and share them with their translators to help them become acquainted with the game they are working on (e.g. Bernal-Merino 2015, 192), there is little information available, and usually no best practices are laid out for how these glossaries are created, what kind of information they contain, and whether or how they are expanded upon during the localization process to cover the target languages.

This thesis aims to provide a look into this topic, by examining current best practices for terminology management within the video game localization process and answering the following research questions:

- RQ1: How is terminology managed in a video game localization project?
- RQ2: How do these practices compare to theories of terminology management and to terminology management practices in specialized translation and software localization?

[2] An overview of the demands and challenges often faced by translators is provided, for example, by Sattler-Hovdar (2016).

By answering these questions, this thesis will show how methods used for managing terminology in the video game industry relate to theories of terminology management, as well as terminology management practices in specialized translation and software localization.

3. Methodology

The methods used for this research project include state-of-the-art literature review and interviews with professionals in the field. Following the descriptive approach that is common within research dealing with video game localization (Mangiron 2017, 89), the strategies employed by developers and translators working on a video game localization project will be explained in chapter 4, before comparing them to best practices for terminology management described by both experts in the field of terminology management and translators working on different specialized translation projects.

The analysis of best practices for terminology in the fields of specialized translation and software localization is based on a literature review. Since the focus is on terminology work in localization projects, more emphasis was put on terminology work with practical applications in mind such as recommendations for terminology work laid out by the Conference of Translation Services of European States (COTSOES 2018) or Dobrina's (2015) analysis of different ways in which terminology related projects can be organized and carried out.

Similarly, best practices for terminology management in video game localization are also analyzed based on best practices for localization described, for example, by Bernal-Merino (2015), as well as Chandler and Deming (2012). While these authors focus more generally on the process of video game localization, they cite professionals working in the industry and some of the best practices described allow for inferences about the way in which terminological consistency is achieved in the processes described. The overview of the kinds of specialized language found in the context of the video game industry provided by Méndez González (2019) allows for a clearer focus for the rest of the analysis as the kinds of specialized language laid out provide an overview for possible areas in which terminology management could be applied in the video game industry.

These more general texts are supplemented by reports by translators and other industry professionals involved in video game localization projects. Some such reports are published on journalistic sites reporting on video game related news, such as *Games Industry.biz* and *Play Magazine*. A very detailed report on the localization of the MMORPG *Aion* is provided by Kim (2019). *Aion* is an MMORPG developed by South Korean publisher NCsoft and was first launched in 2008 (Kim 2019, 43–44). Kim worked on the project with a focus on ensuring key terms were translated correctly and consistently (Kim 2019, 53), making the publication an especially valuable source to gain insights into the treatment of terminology in a video game localization project.

Finally, an interview was carried out with Mathieu Donsimoni, Worldwide (WW) Localization Technical Lead at Ubisoft Montreal (Donsimoni 2023) to gain more direct insights into the treatment of terminology in a major video game development company. Ubisoft is a video game developer founded in 1986. The company became well-known during the 1990s with titles such as *Rayman* and consists of more than 45 studios located all over the world, employing more than 21.000 people. While the company's main focus continues to be on the development of video games and video game technology, Ubisoft has also expanded into other forms of media such as movies, television, and comic books (Ubisoft 2020). The company was listed as one of the top buyers of video game related translation services by Slator (2019, 6), ranking 12th among the 15 largest video game companies.

Interviews are among the most commonly used ways to collect data in social sciences (Nohl 2017, 3) and also quite common in research into the field of video game development where, as detailed above, descriptive approaches are common (Mangiron 2017, 89). In social sciences, interviews are categorized into narrative or biographical interviews, and interviews conducted with the help of an interview guideline, such as interviews centered around a specific issue or expert interviews (cf. Nohl 2017, 3). In biographical interviews, researchers ask an opening question and then listen to the record provided by the interviewee, only asking infrequent questions to clarify certain points, bring up important topics the interviewee might have omitted, or ask the interviewee to explain specific actions (Nohl 2017, 15). An interview conducted with a guideline, on the other hand, is more structured by the interviewer, who asks about specific topics in order to gain insights only into certain aspects of the life of the interviewee or into certain areas of the interviewee's expertise (Nohl 2017, 15–16).

Since the aim of this thesis is to gain insights into the way terminology is managed during the video game localization process, an expert interview is a fitting form of collecting such data. According to Meuser and Nagel (2009, 470), there is no clear definition of who is classified as an "expert" in scientific research, since the classification of a person as an expert and their subsequent selection as an interview partner is highly dependent on the scope and aim of the respective research project. Generally, however, "experts" tend to be people who are in some way responsible for creating, implementing, and supervising processes aimed at solving specific problems. These tend to be people who have "privileged access" to information regarding groups of people, social situations, or processes (Meuser and Nagel 2009, 470). Mathieu Donsimoni fits this definition of "expert" for the scope of the current research project, since he works in a management position within the localization setup at Ubisoft, which puts

him into a position from which he can provide detailed insights into relevant aspects of this process, namely the management of terminology during the localization process.

According to recommendations given for conducting expert interviews by Meuser and Nagel (2009, 472), the interview for this thesis was conducted as an open-guided interview. In this setup, an interview guideline is created and used during the interview, but not to the extent that it would constitute a standardization of the interview similar to employing a standardized survey form (Nohl 2017, 17). The interview guideline is used as a tool to provide a coherent thematic structure for the interview and avoid drifting off too far into unrelated topics (Meuser and Nagel 2009, 472). The guideline is not used as a standardized tool to tick off questions one after another, but rather is employed as a thematic blueprint around which the interview is structured in a flexible manner. By using a guideline in this manner, a researcher can ensure they collect data about topics they want to cover and allow the interviewee the chance to contribute to the information with details they themselves consider to be relevant to the conversation (Meuser and Nagel 2009, 474). This is achieved by allowing the interviewee the time to finish talking about a question raised by the interviewer in their own time before following up with either a related question or by introducing a new but related topic (Nohl 2017, 16).

The interview with Mathieu Donsimoni was conducted on April 21st, 2023, in the form of a call on Microsoft Teams. During the call, an audio recording was created which was later used to create the transcript of the interview found in appendix 1. In contrast to biographical interviews, transcripts of expert interviews tend not to cover the full length of the recording created. Elements of the conversation that do not concern the points of interest tend to be omitted in the transcription, as are filler words or breaks during which a speaker might search for words (Meuser and Nagel 2009, 476). A similar approach was chosen for the transcript created for the interview conducted for this thesis. The transcript focuses on the parts of the interview that are relevant to the discussion of terminology management in video game localization. Timestamps are provided for each change of the speaker, alternating between the interviewer, marked with an “I” and Mathieu Donsimoni marked with a “D”. Additionally, line numbers were added to the finished transcript. These numbers are used to reference the interview when passages are quoted or paraphrased in this thesis. References to the interview are marked with “MD” and provide the line number for the relevant interview passage in the transcript.

4. Terminology management

As discussed above, translation science has always played a role in the study of terminology (Oeser and Budin 1999, 2179–80). This is partly due to the fact that terminology management is an important part of both monolingual and multilingual knowledge and document management processes, as well as translation work (Steurs, De Watcher, and De Malsche 2015, 222). This chapter will provide an overview of translation-oriented best practices for terminology management as they are laid out in terminology science before the practical application of these theories will be discussed in chapters 5 and 6 with a focus on specialized translation and the localization of utility software, and the localization of video games respectively.

4.1 Criteria for termhood

In section 1.4, "terminology" is defined as the sum total of all specialized vocabulary or "terms" within a specialized field (Drewer and Schmitz 2017, 5–6) while "terminology management" is specified as the process of capturing, processing, updating and the preparation for use of terminological data-sets (Steurs, De Watcher, and De Malsche 2015, 222). Before discussing the collection and management of terms, it is first necessary to differentiate a "term" from a "word" to establish clearly what is being managed when speaking about terms from the perspective of terminology science.

Depecker (2015, 37) defines a word as "a linguistic unit which is usually easily isolatable in a language" and specifies that the meaning of a word may be "vague, multiple or changing". A term, on the other hand, is defined as "a scientific or technical reality" with a definition that is "precise and validated by the description of the concept it refers to". While from a linguistic point of view, the ease with which a linguistic unit might be isolated as a word is somewhat controversial[3], from the point of view of a terminologist the distinction between a unit with a changing or vague sense and a unit with a precise definition that refers to a clearly

[3] As is pointed out for example by Tsujimura (2014, 125), while there might be some visual indicators of which units of written language constitute a word, as for example in English, where spaces are used to indicate which units constitute a word, this method is inconclusive, as it leaves the question of whether units such as "round-trip" or "I'm" should be considered as one word or something else. The question becomes even more complex when taking into account the fact that, in most spoken languages, words are pronounced continuously, leaving no indication of which parts of spoken language constitute words. Moreover, not all languages use spaces in written language either, as is the case for example in Japanese, and some languages have units of meaningful sound that would translate to entire sentences in other languages. Nevertheless, speakers are able to identify and understand words of a language, and while no conclusive answer to the question of which linguistic units are words has been found, a definition of words as "free standing sound-meaning units" can be applied (Tsujimura 2014, 125).

laid out concept is the key difference between these units of language. Terms generally consist of a word or a group of words that acquire a precise meaning within a special domain (Depecker 2015, 38). Terminology science is therefore not only interested in the linguistic properties of terms, but also puts heavy emphasis on the "concept" behind a term and the "object" any given term refers to.

The relationship between these three dimensions, "terms" or, more broadly speaking, "linguistic symbols", "concepts", and "objects", is visualized in the semiotic triangle, which has been adapted by terminology scientists. An "object" in this model is a part of the real world. Objects can be material objects, as well as more abstract sets of facts or processes. A "concept" describes the mental representation of an object in the real world that a person has in their mind. Concepts are created subconsciously by abstracting common traits of objects perceived in the real world and using the concepts created this way to better understand the world or make sense of it (Drewer and Schmitz 2017, 7–8). Concepts can also be described as units of thought or a mental representation of an object conceived in a person's mind (Depecker 2015, 37) and are not specific to languages, but to cultures (Drewer and Schmitz 2017, 8). Finally, a "linguistic symbol" is a unit of speech used to express the concept of an object through the medium of language. While in terminology science, the most relevant linguistic symbols are terms formed by one or more words, other kinds of symbols such as formulas or pictograms can also be used (Drewer and Schmitz 2017, 14). Thinking back on the differentiation between "word" and "term" given by Depecker (2015, 37), a term having a definition that is "precise and validated by the description of the concept it refers to" means that, in terminology science, a clear link between a term, the concept behind it, and the object it refers to is established. This ensures that each term is only a linguistic representation of one precise concept, which in turn precisely fits the object it describes (Depecker 2015, 36). This relationship between terms, concepts and objects is also called a bijective relationship (Drewer and Schmitz 2017, 15).

To ensure that a term actually refers to a precise concept that in turn represents only one specific object, a precise terminological definition is required. Such a definition gives the necessary and sufficient conditions for an object to be clearly identified and associated with a term (cf. Hacken 2015, 4). In more technical terms, Hacken (2015, 4) states that a terminological definition "starts by specifying a hyperonym and then specifies conditions to distinguish it from its co-hyponyms". A hyperonym is a general concept, while a hyponym refers to a more specific concept (García and Alcina 2009, 236). This can be further illustrated with the example of the terminological definition given for the term "planet" by the International Astronomical Union in 2006. There, a "planet" is defined as "a celestial body that

is (a) in orbit around the sun (b) has sufficient mass for its self-gravity to overcome rigid body forces so that it assumes a hydrostatic equilibrium (nearly round) shape and (c) has cleared the neighbourhood around its orbit" (cf. Hacken 2015, 4). The hyperonym, or the necessary condition, for an object to be classified as a "planet" according to this definition is that the object in question is a "celestial body". Then, to be distinguished from other celestial bodies, or it's co-hyponyms, a "planet" also has to fulfill the sufficient conditions laid out by the parts of the definition labeled (a) through (c). By defining the boundaries of a concept precisely with a terminological definition, a term is created. In practice, this is usually only done with the aim of settling legal or scientific disputes, whereas, when working with specialized vocabulary in other contexts, more descriptive lexicographic definitions are broadly used and usually sufficient (Hacken 2015, 6–7). These definitions still need to be based on information from other specialized knowledge resources (Faber 2015, 15) and be precise enough to distinguish a term from other terms and avoid ambiguities (Drewer and Schmitz 2017, 19).

Since terminological definitions are not always used in terminology work, setting them as a requirement to determine the termhood of a linguistic union would not be practical. Another approach to determine termhood is proposed by Heylen and de Hertog (2015) with the goal of automated term extraction in mind. They define termhood as "the degree to which a stable lexical unit is related to some domain-specific concepts" (cf. Heylen and De Hertog 2015, 211), thereby not eliminating the need for a definition but allowing for more descriptive lexicographic definitions to be used. Linguistic units are identified as "the degree of strength or stability of syntagmatic combinations and collocations" (cf. Heylen and De Hertog 2015, 206). Not all stable lexical units are terms, however, which can be exemplified by taking a look at phrases such as "most of the time" which have a high degree of unithood, but don't refer to a specific concept in any domain and therefore cannot be considered terms (Heylen and De Hertog 2015, 211). In order to be considered a term, a lexical unit therefore has to be both stable, and it has to refer to a specific concept within a specific domain, which can be ensured by providing a definition for it that is precise enough to differentiate it from similar terms.

4.2 Aim and setup of terminology work

Work involving specialized vocabulary or sets of specialized vocabulary can be referred to as terminology work (Drewer and Schmitz 2017, 6). Terminology management is one part of terminology work and focuses on capturing, processing, and updating sets of specialized vocabulary to make them usable for various target groups. The main goal of such an undertaking

is usually to reduce the cost and increase the efficiency of a writing or translation process and to enhance the quality of the texts being produced. Since words and terms can have different meanings depending on whether they are used in a general or a specialized context, as well as depending on the specific specialized field they are used in, terminology management can help to ensure that a term is being used consistently throughout a text, making the text more readable and understandable. This does not only increase the usability of a text in the language it was originally written in, but translators also benefit from access to a multilingual terminology resource which allows them to work more efficiently, reducing the time required for translating a text (Steurs, De Watcher, and De Malsche 2015, 222–24).

When managing terminology with translators as a user-group in mind, the two main approaches that have evolved are the creation of detailed and strictly controlled multilingual term banks by terminologists and the creation of smaller collections of terminology sets by translators also referred to as termbases (Bowker 2015, 306–7). Both resources can be used to facilitate a translation process, but the focus in this chapter will be on the systematic approach employed by terminologists working in accordance with the principles laid out by terminology science.

Systematic terminology work is usually carried out as a project (Dobrina 2015, 180). This requires the steps for creating a termbase to be broken down into sub steps and arranged into smaller "sub-projects" that should each yield a tangible result that can in turn be assessed and evaluated. Likewise, it should be possible to complete each sub-project within a set time frame and the sub-projects should contribute to the main aim set out for the project as a whole in a meaningful way (COTSOES 2018, 72–73). The concrete aim of a terminological project will depend on the specific context any project is carried out in, but the general aim of a terminological project is to provide a comprehensive overview of the terminology in one or more domains in one or more languages in a way that meets the needs of an identifiable user group. A terminology project will typically consist of three main phases that can be broken down into several sub-tasks. The first phase is a *preparatory phase* during which the material that will be used for conducting the terminology work is researched and selected. This is followed by the *main phase* during which the actual terminology work is carried out before a project finishes with the *presentation phase* during which the terminology is presented to the intended user group in the form of a terminology resource (Dobrina 2015, 281). The phases of a terminological project and the sub-tasks they contain will be discussed in greater detail in section 4.5, however, even a brief overview shows that a terminological project requires a great investment of time and, by extension, money in order to produce a resource of high quality.

Justifying this investment and showing the benefit of terminology work for a company is not a simple task, because managing terminology is not often broken down as a separate cost during a translation process. This causes both the work invested in managing terminology and the benefits terminology management provides to remain "hidden", and clients might not be aware of the benefits terminology work provides. There are, however, studies that show that implementing terminological control on a source text before sending it out to translation reduces the cost of revisions, especially when a text is translated into multiple languages. This is due to the fact that catching and fixing a terminological issue in the source text is significantly less time consuming than finding the same issue in several translated texts in multiple languages (Bowker 2015, 305). Similarly, terminology management can help companies ensure the implementation and usage of a corporate language, increasing the recognizability of a brand and facilitating the creation of a corporate identity. Terminology management has therefore become an important factor in documentation processes of large companies, where it is used to increase the quality and consistency of both source language documentation and translations into various languages. In order to profit from the investment made into terminology management to the largest possible extend, a terminology resource can be made available to different user groups, for example both technical writers producing source language documentation for a project, marketing staff creating advertising campaigns for it and translators for different languages the documentation and marketing material get translated into (COTSOES 2018, 12–13).

Systematic terminology work that aims to create a multilingual terminology resource for a specific domain requires terminologists for each target language to work with experts in the field the terminology resource is created to cover. This requires the parties involved to set out a clear framework for the terminology work not only regarding the planning steps that are taken during the first phase of a terminological project, but also regarding the legal framework the work is going to be carried out in. For example, questions of copyright and user rights should be settled before the project begins. Moreover, terminology work will be conducted more efficiently if all parties involved agree on and ensure all have the same level of knowledge about various aspects of the project, including the methods used to carry out the project, the quality standards the resource that gets created is to meet, the communication pipeline for the project, and the specific roles of everyone involved in the project. This can include establishing who has the authority to make changes, what kind of changes are to be made on the resource as it is created, who will perform what kind of quality checks and who will work on entries in what capacity (COTSOES 2018, 32–34).

4.3 Relationships of terms in a terminological system

One of the goals of a terminological project is to bring order to terminology in one or more domains (Dobrina 2015, 181). To achieve this, terms are not simply collected and put in a list but are also ordered into a system, also referred to as an ontology. An ontology shows not only the terms themselves but also their conceptual relationships to one another (Drewer and Schmitz 2017, 9), which can be understood as "semantic links between two or more specialized concepts" (García and Alcina 2009, 235). Conceptual relationships can be hierarchical as well as non-hierarchical, but hierarchical relationships, which super- and subordinate terms in relation to one another, are most commonly depicted in terminology work (Drewer and Schmitz 2017, 9).

Hierarchical relationships can themselves be divided into Partial and Logical relationships. Partial relationships describe relationships between terms where a superordinated term can be divided into parts which are each a term in their own right (Drewer and Schmitz 2017, 9). García and Alcina (2009, 237) call this a Meronymic relationship and give "Relationship between the parts that together make up a whole" as an example of such a relationship. Logical relationships, on the other hand, are derived from a comparison of the concepts behind a set of terms (García and Alcina 2009, 236). A term that is subordinated to another term in a logical relationship will have all traits associated with the superordinated term and at least one more trait that differentiates it from its superordinated term (Drewer and Schmitz 2017, 9). Non-hierarchical relationships can also be subdivided into sequential and cause-and effect relationships (Drewer and Schmitz 2017, 9). Depending on the specific domain that is being covered, defining other relationships between terms that do not fit into the relationships listed above can be helpful to structure the knowledge in that domain (García and Alcina 2009, 239).

Apart from the relationships described above, which put two or more terms that represent different concepts into relation to each other, terms can also be related to one another based on synonymy or ambiguity. Two terms are considered synonyms of each other if they both refer to the same concept in the same language. In practice, this is a very common occurrence since, for example, acronyms are often used synonymously with the longer term they are acronyms of (Drewer and Schmitz 2017, 16), as is the case with the German acronym "LKW" which is commonly used instead of the proper term "Lastkraftwagen". Terms are ambiguous, on the other hand, if the same term is used to refer to different concepts. For example, the term "mouse" is ambiguous, as it can refer to either the mouse used to make inputs

in a computer or a rodent (Drewer and Schmitz 2017, 17–18). Since the two concepts referred to by "mouse" are located in two different domains, computer technology and zoology respectively, the ambiguity of the term is unlikely to cause issues when discussing terms in either domain. However, as indicated in section 4.2, terminologists usually try to avoid ambiguities whenever possible, since ambiguous terms can cause problems when they occur within the same field because they muddle the precision of the affected terms and make communication within the affected field less efficient. (Drewer and Schmitz 2017, 19–20).

When carrying out terminology work with translators as a target user group in mind, equivalence is another relationship between two terms that needs to be considered. Similar to synonymy, equivalence describes a phenomenon where two terms refer to the same or, in most cases, nearly the same concept, but equivalence is only applicable to terms from different languages (Drewer and Schmitz 2017, 20). In a best-case scenario, a full equivalence between two terms can be established, meaning that they refer to the exact same concept in different languages. In most cases, however, since the concepts referred to by terms are culture-specific, partial equivalent relationships, in which two terms refer to mostly but not completely identical concepts, are more common. Finally, cases where a term does not have an equivalent term in a target language are called gaps. Such gaps can arise from the lack of a term to refer to a concept in one language while the concept itself is known in that culture, in which case there is a terminological gap. Gaps caused by the lack of a concept in a culture and subsequent lack of a term for it in a language are called conceptual gaps (Drewer and Schmitz 2017, 21–22). Finding equivalent terms and identifying gaps in the ontology of a domain in a target language is a vital part of terminology work for translation. Since equivalence of two terms is established by contrasting their traits as they are stated in adequate definitions, having proper terminology systems for each language that is to be contrasted is vital for this kind of terminology work (Drewer and Schmitz 2017, 20–21).

4.4 Types of terminology work

There are different types of terminology work that use different methods and produce terminology resources of different scopes and quality. The type of terminology work that is used in any specific case depends on the aim of the work and the resources available to the person carrying it out. COTSOES (2018, 67–70) differentiates ad-hoc, text-based, and systematic terminology work based on the scope of the work that ranges from solving a terminological issue that arises during the production of a translation or a specialized text to

systematically researching and cataloging the terminology of a specific domain (COTSOES 2018, 66). Furthermore, terminology work can be classified into a priori and a posteriori work depending on whether it is carried out before or after the terminology produced is or was used to produce a specialized text or a translation (COTSOES 2018, 70).

Ad-hoc terminology work is usually carried out due to time pressure and only aims at solving a specific terminological problem that arises during a translation or interpreting task or during the production of a specialized text (COTSOES 2018, 66). It is the kind of terminology work most commonly carried out by translators or interpreters during translation or interpreting tasks (Bowker 2015, 311), and the aim is usually only to clarify the meaning of or to find a translation for a single term. Any terms that might be super- or subordinated to this term are not considered during research. Nevertheless, collecting the findings of such terminology work as rudimentary entries in a database can be a way to identify term candidates for growing the database in question (COTSOES 2018, 66–67).

Text-based terminology work is recommended to translators or interpreters taking on the translation of a long scientific text or a task at a conference or similar setting, provided there is enough time to carry out such work while still meeting the deadline for the translation task at hand. This kind of terminology work offers a translator or interpreter a chance to familiarize themselves with the terminology of a specialized domain before working on translations for said domain by analyzing texts originating from the target domain and familiarizing themselves with the terminology and jargon used there. This kind of terminology work usually involves more in-depth analysis and yields more detailed results than ad-hoc terminology work and could be considered a small terminological project (COTSOES 2018, 68).

Finally, systematic terminology work can be considered as terminology projects (COTSOES 2018, 69). A project can generally be defined as "a one-off undertaking with a definable end result or product (defined objectives, resources, processes, time frame and budget)" (Cerrella Bauer 2015, 325). In case of a terminological project, the objective usually is to bring order to the terminology of one or more domains while meeting the needs of an identifiable user group. A terminological project either produces new terminological information or enhances the quality of an existing terminological resource (Dobrina 2015, 181). Such projects usually aim to catalog the terminology of an entire specialized domain and produce a detailed terminological resource that depicts terms in relationship to one another while also making the most efficient use of the time and resources invested, since a well-documented terminological project reduces or even eliminates the need for ad-hoc terminology work to be carried out by users of the resource down the line (COTSOES 2018, 69). The results

of terminology projects are enhanced by having terminologists consult with experts in the domain the terminology covers, combining their own terminological and linguistic expertise with the domain expertise of these experts (Dobrina 2015, 181).

Terminological projects can in turn be classified, among other things, depending on whether they are first time elaborations of a domain, aim to revise or extend an existing terminology resource, or add new languages to an existing resource (Dobrina 2015, 182). Dobrina (2015, 182–85) identifies the terminological needs a terminology project needs to meet, the objectives of the project, it's target user group, and the properties of the terminology resource that is created as important features for the classification of terminological projects and, based on them, distinguishes 7 types of terminological projects.

The objective for the first type of terminological project, *creating a monolingual resource*, is to create a new resource or an update for an existing monolingual terminological resource to promote effective communication in a domain, organization, or project. A resource produced as the result of a type 1 project covers the terminology used in an organization or a project and presents terms along with information about their status as preferred, allowed or deprecated as well as information about a term's usage. Grammatical information, definitions, and the relationship to other terms in the resource are also usually made clear. Similarly, when *creating a multilingual domain resource* in the context of a type 2 terminological project, the objective remains largely the same, but communication is to be improved across two or more languages. The information presented in a resource produced by such a project covers the same information as a resource created during a type 1 project, but adds information about equivalent terms in different languages and the degree of equivalence (Dobrina 2015, 183). Similarly, a type 3 project aims at *localizing a monolingual mono-domain resource*. Such projects are usually started to make terminology accessible to all participants of an international project associated with a specific domain, or when an international terminology standard needs to be translated to be adopted in a country. Project type 4 covers projects with the aim of *adding a new language to an existing terminology-oriented resource*. These projects usually produce resources that are explicitly meant to be used by translators and cover the same information as a resource produced during a type 2 project. If a target user group has issues using a terminology resource due to its insufficient quality, a type 5 project might be started with the aim of *enhancing the terminological quality of a resource*. This can be achieved, for example, by providing better definitions for the concepts in the problematic resource or by improving the structure and presentations of the resources entries (Dobrina 2015, 184). Projects with the aim of *merging existing resources into a multidomain and/or multilingual resource* are classified as

project type 6. Such projects usually create resources with a large intended user group, as they combine large numbers of existing terminological resources into a single one that covers a wide variety of subjects and/or languages. The structure of terminological resources created during a type 6 project is often similar to that of resources created during a type 2 project. Finally, projects associated with type 7 aim at *producing terminology on demand (maintaining a terminological query service)*. This kind of project is not aimed at producing a terminological resource. Rather, the aim is to provide a group of users with terminological information as it is needed. Type 7 projects are associated with ad-hoc terminology work (Dobrina 2015, 185).

4.5 Phases of a terminological project

As mentioned in section 4.1, a terminological project consists of three main content-related phases (Dobrina 2015, 181). Before beginning the content-related phases of terminology work, however, a *project planning phase* should be added, during which the exact scope of the project is defined and all resources required to carry out the project are organized (Cerrella Bauer 2015, 326). During the project planning phase, a project plan should be created that outlines the goal of the project, the ways in which these goals can be accomplished, the target group of the project, the tools, resources, and timetable that are to be used or implemented in order to accomplish the goals, and the means by which the results of the project are to be evaluated. (cf. Cerrella Bauer 2015, 326–27). Writing out a project plan can help to establish a clear scope and purpose for the project and provide clarity as to who is going to work on it, what their role is, and which concrete tasks this role requires to be carried out. Having clear, established deadlines also helps with achieving the goal of the project (Cerrella Bauer 2015, 328).

Once the planning phase of a project has finished, work on the first content-related phase can begin. During this phase, which Dobrina (2015, 181) calls the *preparatory phase*, the team is mainly concerned with collecting relevant material, that is going to be used for the subsequent terminology work. This includes not only selecting a domain or subdomain to be covered (Dobrina 2015, 187), but also requires the team to conduct research into and familiarize themselves with the selected domain and clearly differentiate it from neighboring fields (COTSOES 2018, 71). Once the target domain is decided on, a corpus of sources for the terminology work needs to be created, which should reflect the state of the art in the domain of interest (Dobrina 2015, 188). Researching existing terminological resources in the domain and reaching out to experts in the field for cooperation is also recommended during this phase (COTSOES 2018, 71).

After the preparatory phase has concluded, the second content-related phase of a terminological project is called the *main phase*, during which the concepts and terms that are going to be included in the terminological resource are selected (Dobrina 2015, 181). In theory, the concepts and corresponding definitions that are to be included in a terminology resource should be selected first and the terms to represent them should be selected afterwards. In practice, however, since the majority of terms to describe concepts in any given domain already exist and sometimes more than one term exists to describe a concept, these terms are compiled and rated to determine which terms are preferred, meaning the most established terms that should be used to represent a concept, which terms are admitted, meaning they are less established than the preferred terms but can be used, and which terms are deprecated, which means they should not be used (Dobrina 2015, 189). In normative terminology works which aim to set standards for the use of terminology in a given domain (Dobrina 2015, 182), only one preferred term for each concept is permitted to keep the bijective relationship between terms, concepts and objects intact. Terminology work with a more descriptive approach, on the other hand, allows the existence of synonyms within the resource that is created but will usually only list one term as the preferred term (COTSOES 2018, 36).

In order to compile and rate terms within a domain, terms are extracted from the sources compiled during the preparatory phase and a term candidate list is created (COTSOES 2018, 71). Term extraction can be carried out manually by a terminologist who analyses their sources, lists potential terms, and validates their list by consulting with a domain expert. This is a very time-consuming process which can be enhanced by using automatic term extraction to have the task of selecting term candidates from a corpus performed by a machine (Heylen and De Hertog 2015, 205). In such a setting, the evaluation of the term candidate list still has to be done by a human actor, but a lot of time can be saved nonetheless (Heylen and De Hertog 2015, 204).

Once the term candidates have been selected, the next step is to organize them into a system (COTSOES 2018, 71), which is to say the relationships detailed in section 4.3 need to be established for the term candidates at hand. Definitions for the terms also need to be formulated so that they give all essential characteristics of each term and are precise enough to differentiate terms from one another (Dobrina 2015, 190). Nowadays, nearly all systematic terminology work is carried out with the aim of creating a termbase, a computer database which contains all information about the domain specific concepts and the terms used to represent them within a domain (Steurs, De Watcher, and De Malsche 2015, 224). Termbases are made up of terminological entries that contain information about each term organized into data

categories. An entry should be created for each term included in the database, even if a term is a synonym of another term (COTSOES 2018, 36).

Looking at all data categories, a user should be able to glimpse all relevant information about a term regarding the concept it represents, its relationship to other terms in the database, and its usage (COTSOES 2018, 37). While there is no fixed set of data categories that need to be included in a termbase (Warburton 2015, 385), COTSOES (2018) recommends the inclusion of the following data categories. First of all, the term itself should naturally be included in its canonical form or, in case of multiword terms, in its natural word order (COTSOES 2018, 37–40). A source should also be provided for every piece of information included in the terminological entry, starting with the term itself (COTSOES 2018, 41–42). A definition that matches the requirements of the terminological resource also needs to be provided (COTSOES 2018, 44–51), as well as various other information about the term, including grammatical information and its status as an allowed, admitted, or deprecated term (COTSOES 2018, 51–54). Proving an example of the term being used in context or a graphical representation can also help to make a termbase more user friendly (COTSOES 2018, 54–56). Lastly, a database entry needs to contain administrative information, detailing the author of the entry, the date it was created and last edited, an individual identification number to make it easier to find specific terms, and various other information (COTSOES 2018, 58–60). Since every terminological project needs to meet different needs laid out during the planning and preparatory phases, the entry structure for each termbase is likely going to be slightly different from one another (Dobrina 2015, 194).

After all information for an entry has been compiled, each entry needs to be validated by a domain expert and some final adjustments might need to be made (COTSOES 2018, 72) before proceeding to the final phase of the project which Dobrina (2015, 194) calls the *presentation phase*. This phase consists of presenting, or publishing, the finished terminology resource, making it available to the intended user group. Although the presentation phase might be the end of an initial terminological project, there is still work to be done afterwards to update and maintain the term database to ensure that it remains usable and accurately reflects the current state of the art in the domain it covers (COTSOES 2018, 92). Taking care of a terminological inventory can include tasks such as checking that definitions are still up to date, correcting entries when necessary, and removing double entries from the inventory (COTSOES 2018, 93). Since this is another time-intensive task, especially when maintaining large termbases, COTSOES (2018, 102–4) recommends organizing this maintenance work in the form of

subsequent projects and laying out a clear structure and clear rules for how, when and by whom such maintenance should be performed.

5. Terminology management in specialized translation and software localization

Before diving into the treatment of terminology in the context of video game localization projects, first other practical applications of terminology management will be explored in this chapter to see if similarities to the practices described for video game localization can be found there later on. Specifically, applications of terminology management in specialized translation and software localization will be discussed, since software localization bears some similarities to video game localization regarding the challenges faced by translators working in the field, such as the need to work within constraints for the length of translations posed by the software interface (Behrens 2016, 16:90–93). Translators working in video game localization also commonly use the same tools that are used in specialized translation settings (Kim 2019, 97). Moreover, different approaches to choosing candidates for inclusion in a terminology database laid out by Warburton (2015), as well as possible ways to use crowdsourcing in terminology projects described by Karsch (2015), and the application of terminology management in the more creative field of translating restaurant reviews explored by Rodrigues Rebechi et al. (2022) will be taken into account, since they provide insights into applications of terminology work that deviate from the theories and practices laid out in the previous chapter in order to adapt terminology management to different practical settings.

5.1 CAT-tools and terminology management tools

In specialized translation, translators rely on a variety of tools to help them with their work and increase their translation productivity. The most commonly used tool group in translation consists of Computer-Aided Translation tools (CAT-tools) (O'Brien et al. 2017, 145), which are also sometimes referred to as translation memory tools and have been in use to some extent since the 1960s, when the European Coal and Steel Community developed and implemented a computer system to help their translators retrieve terms and context from human translations stored in the system (Reinke 2013, 28). Even though CAT-tools can still be a source of frustration for their users, they have played an instrumental role in increasing translator productivity and the consistency of translations, and have helped in reducing repetitive work (cf. O'Brien et al. 2017, 145). CAT-tools can include a variety of features, but commercial tools usually include a multilanguage editor for translators to input their translations, a terminology management feature, a feature for automatically recognizing terms in the segments a translator is currently working on, a concordance tool translators can use to search for a specific word or phrase and see all instances where it appeared in previous translations, a translation memory

and a statistics feature to determine matches a new segment has with it, and an alignment tool to create translation memory databases from previously translated texts (Reinke 2013, 29–30).

In a survey conducted by the European Language Industry Survey (ELIS) in 2022, only 12% of participating independent language professionals reported never using any translation memory tool. More than 50% percent of participants reported using translation memory technology on a daily basis, with more than 80% reporting using it daily, regularly, or occasionally. These results show that "CAT technology is slowly but surely implemented in all use cases, including those that for which the technology used to be considered less useful" (ELIS 2022, 23). CAT-tools were even more broadly used by language companies, where only 3% of respondents reported not using CAT-tools. Similar answers were given for terminology management tools by independent professionals, where, although only about 20% of participants reported using such tools daily, around 80% of participants reported using it daily, regularly or occasionally (ELIS 2022, 23). On the buyer side, 36% of participants reported that "their language providers are completely free in using the technologies they prefer", leading ELIS researchers to infer that "64% of technology use is to some extent guided or imposed by the client to match the latter's own technology stack" (ELIS 2022, 24).

Among the specific CAT-tools used by language companies, Trados and memoQ were stated as the most commonly-used tools (ELIS 2022, 27). memoQ is sold by memoQ Translation Technologies (memoQ n.d.) while Trados is one of the tools offered by RWS (RWS n.d.). Both tools offer similar features, including a translation memory and termbase feature. However, memoQ seems to have a higher focus on offering services explicitly to video game developers, having established a dedicated memoQ Gaming Unit to cater to clients from this industry. When informing about this unit, implementing the use of the translation memory and termbase feature are highlighted as key tools to help localizers work more efficiently and keeping terminology consistent when several translators are working on something at the same time (memoQ n.d.). memoQ was also mentioned as the translation tool used by Ubisoft during the interview conducted for this thesis (MD 112). Therefore, memoQ will be focused on more heavily when discussing features of CAT-tools relevant to video game localization, even though other CAT-tools can be expected to offer similar features and functionalities.

The most prominent feature of any CAT-tool, as well as the one most often used by translators, is a translation memory (ELIS 2022, 23). A translation memory is a database in which translation units, pairs of source segments and their respective target language translations, are stored. This database can be considered a dynamic one because new translation units can be added during the translation process when a translator saves new translations into

the translation memory, by importing existing translation memories, or by aligning previously translated texts (Reinke 2013, 32–33). Once a translation unit has been stored in a translation memory, translators will receive suggestions based on "matches" found for a new segment of text in their translation memory (Reinke 2013, 27). memoQ presents matches from a translation memory and gives a percentage for each match to indicate the degree of similarity between a new segment and matches found in the translation memory. Segments that are exactly like a translation unit already stored in the translation memory and were translated in the same context, meaning the segments preceding and following the new segment are also identical to the preceding and following segments of the stored translation unit, are considered "Context matches" or 101% matches. In addition, memoQ retrieves "exact matches" or 100%-matches in cases where a segment is the same as a translation unit and ranks other matches, also referred to as "fuzzy matches" based on the similarity between a new segment and the unit retrieved from the translation memory, which is indicated by a percentage (memoQdocs n.d.).

In addition to matches for entire segments, many CAT-tools, including memoQ, offer "subsegment matching", which means the retrieval of fragments of segments for which matches exist in the translation memory (Reinke 2013, 33). These matches are presented to the translator in the *Translation results pane* of the tool alongside matches for entire segments retrieved from the TM and matches from the termbase associated with the project (memoQdocs n.d.). Figure *1* provides an example of what the Translation results pane might look like for a given segment:

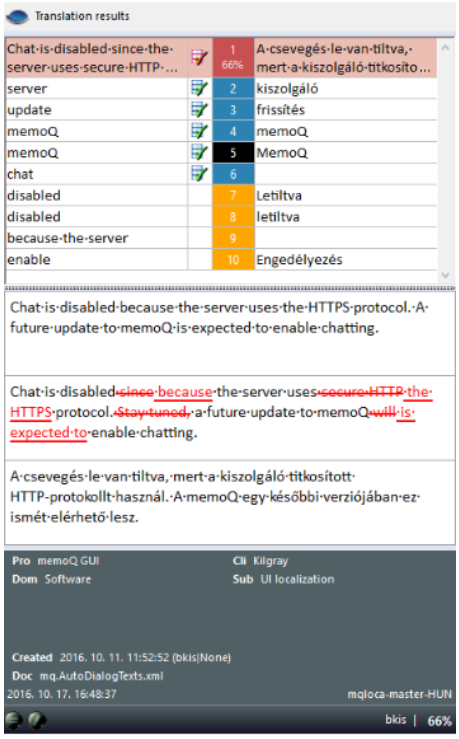


Figure 1: The Translation results pane in memoQ (memoQdocs n.d.)

As can be seen in Figure *1*, matches for entire segments that are retrieved from the TM are presented at the top of the Translation results pane. They are visually marked by a red field that includes the percentage of the TM-match with the current segment. Below TM-matches, matches found in the termbase of the project are indicated. These matches are separated into blue fields to indicate allowed terms and black fields to indicate deprecated terms (memoQdocs n.d.). Lastly, memoQ provides two types of subsegment matches to its users. The first type of subsegment matches suggested by memoQ is created by retrieving the "longest common substrings (LSCs) from [translation memory] database units" (Reinke 2013, 33). These matches are indicated by a light orange field. The second type of subsegment match is not represented in Figure *1*, but would be presented with a purple field above the light orange LSC-matches when present (memoQdocs n.d.). Such "Fragment-assembled matches" (memoQdocs n.d.) consist of suggestions assembled from fragments retrieved from the translation memory. These suggestions are created by searching the translation memory database for shorter translation units that are part of the current source language segment and inserting and combining the target language sections of the units retrieved. The resulting suggestion usually contains a mixture of source and target language fragments and cannot be used without further modification (Reinke 2013, 33).

Another common feature of translation memories within CAT-tools is the ability to perform monolingual or bilingual concordance searches within the entries of the translation memories attached to the current project to look up words or phrases for which no match was found in the translation memory. Concordance searches can also be useful when the translation of a given word has not been specified using the termbase feature (memoQdocs n.d.).

Regarding terminology management, specialized stand-alone tools for creating and maintaining termbases exist. One of the first such tools was SDL Multiterm, that was created in 1990 (Steurs, De Watcher, and De Malsche 2015, 225) and is still offered by RWS today (RWS n.d.). Apart from such "pure" terminology management tools, many CAT-tools also offer a terminology module that is integrated into their translation environment. Integrated modules are often more rudimentary than stand-alone tools and focus more heavily on applying the terms included in their database in the translation workflow (Steurs, De Watcher, and De Malsche 2015, 245). memoQ also has a termbase feature, which can be filled in by translators manually during the translation process. Terms that are included in the termbase are automatically retrieved from the termbase for each segment and are presented to the translator (memoQdocs n.d.) in the manner described above. In such a setup, CAT-tools also allow for an automated quality assurance of term usage, checking whether terms found in a segment are translated using

termbase entries (Steurs, De Watcher, and De Malsche 2015, 248). Additionally, memoQ also supports automated term extraction as a means for adding new terms to a termbase (Steurs, De Watcher, and De Malsche 2015, 247) and terminological data can be imported into an existing termbase using CSV-. TMX-, or Excel-files (memoQdocs n.d.; n.d.; n.d.). In contrast to stand-alone terminology tools such as MultiTerm, the termbase integrated into memoQ does not comply with standards for terminology management laid out by ISO, which might be due to the heavy focus on making the terminology easily accessible during translation processes (Steurs, De Watcher, and De Malsche 2015, 245).

5.2 Software localization

When discussing software localization, the focus tends to be on the localization of utility software, which is an umbrella term used to describe applications that can be installed on a computer and whose general purpose is to enable any user of said computer to perform specific tasks the software was designed for (Bernal-Merino 2015, 79). Software localization is not only a linguistic process but can also involve adapting the layout of the software product or making adjustments to the size or placement of UI-elements such as buttons (Behrens 2016, 16:190). Nevertheless, Kim (2019, 95) describes working on a localization project for a support-software designed by car manufacturer BMW as a "specialized translation project" and does not mention being tasked with performing any work for the project that was not related to translation.

Similarly, Behrens (2016, 16:157–58) notes that the practice of having localizations performed by a team composed of both development and translation experts has become uncommon, with localization more frequently being divided into different subtasks handled by different people. This in turn creates longer supply chains that are vulnerable in terms of both quality and scheduling. The fragmentation of the process also limited translators' abilities to influence decisions that might be relevant to the overall localization, limiting their ability to impact the overall quality of the end product mainly to areas that are directly related to translation (Behrens 2016, 16:158). This setup appears to bear many similarities to the localization setup commonly found in video game localization projects, where, as detailed in previous chapters, localization is often outsourced to vendors whose ability to influence areas of the localization process outside of the assets they are given to translate can be limited. For example, vendors often work with heavily fragmented source files and don't usually see the

text they work on in its actual in-game context (Bernal-Merino 2015, 202). This makes the two fields well suited to compare strategies for managing terminology.

While specialized language generally is used in software, the actual extent to which it is used can vary depending on the complexity of the software, which influences how much specialized terminology is needed in order to enable a user to work with a given software product efficiently. Regardless of the amount that is used, specialized terminology can be considered an essential part of the user interface of a software, as well as the user assistance material produced to accompany it, making "avoiding indeterminate, incorrect and inconsistent use of terms and icons (…) one of the major goals of software development, quality assurance and usability testing" (Schmitz 2015, 453). Schmitz (2015, 461) argues that managing terminology associated with a software product is a requirement for software localization, since without a consistent use of well-defined terminology throughout a software product, an adequate localization cannot be achieved. In order to effectively manage terminology with software localization in mind, Schmitz (2015) makes suggestions on how to expand upon traditional approaches to terminology management, which will be discussed in detail in section 5.4.

Comparing software localization to video game localization, Kim (2019, 95) states receiving "a complete list of authorized, equivalent terms in the target language" as one of the main differences between working on the localization of *Aion*, where, due to the fictional nature of a lot of the terms used in the game, a lot of translations had to be invented by the localization team, and working on the localization of a software for BMW. Moreover, during the software localization project translators were asked to use the termbase integrated into their CAT-tool[4], which contained the relevant terminology and highlighted terms in the segments the translators were working on to allow them to insert the correct terminology (Kim 2019, 95). Translators could sometimes compile entire sentences using only the termbase, which made the process faster than the translations done for *Aion*, even though the same CAT-tool was used in both projects (Kim 2019, 97–98). Kim (2019, 101–2) also notes that even though both the *Aion* and the BMW projects had large amounts of text that were split up between several translators working on the same text simultaneously, due to the fact that the strings associated with the BMW software were translated using mostly the terminology that was supplied by the client and the writing style employed in the software was monotonous, the issues with keeping

[4] When describing this feature of the tool that was used during the project, Kim (2019, 95) refers to it as the "dictionary of the CAT-tool", but the functionality he describes is very similar to that of a termbase integrated into commercial CAT-tools such as memoQ (cf e.g. memoQhelp n.d.).

translations consistent were not as pronounced as during the work done on *Aion*. According to Kim (2019, 103), using the termbase of the CAT-tool was often not an option during work on *Aion* or would not have helped translators understand their source segments due to the fictional nature of a lot of the terminology and the more lyrical nature of the text itself which requires translators to check existing translations to ensure the style used in the writing of the game remains consistent.

5.3 Specialized translation

Heidrich (2016, 96–97) highlights the need for a translator to possess knowledge about the domain they are translating in as one of the core characteristics of specialized translation. Moreover, translators working in this field need to take a critical eye to their source material in order to be able to spot errors in them and avoid replicating such source language errors in their translations (cf. Heidrich 2016, 97). In specialized translation settings, using correct terminology consistently is one of the core criteria for evaluating translation quality (Heidrich 2016, 197). Language service providers often work using glossaries supplied to them by their clients. However, these glossaries are often compiled without input from a terminologist (Nédey et al. 2022, 102).

CAT-tools used in commercial settings usually integrate a termbase function, allowing translators to see both translation memory and termbase entries that correspond to the segment they are working on (Reynolds 2015, 280). Problems can arise whenever there are discrepancies between a match retrieved from the translation memory and the termbase associated with a project. Discrepancies can occur when changes to the terminology associated with a project are made during a translation, thus creating a translation memory entry, but are not reflected in the termbase or vice versa, if the termbase for a project is updated, but translation memory matches still reflect older terminology (Nédey et al. 2022, 102).

In such instances, translators have to decide which of the conflicting resources they rely on (Reynolds 2015, 281). Reynolds (2015, 282) proposes 3 levels of credibility for terminology available to translators, placing terminology the customer has specifically asked to be used as well as terminology received from the customer or by acknowledged experts in a relevant field at the highest level. Below this, he ranks terminology that has been approved by other professional translators, stating that the more translators verify a term, the more likely it is to be correct. Finally, the lowest level of credibility for terminology according to Reynolds (2015, 282) contains terminology retrieved using a software tool without further verification of the

terms extracted this way, or terminology a translator researched by themselves but which hasn't been approved by the customer, experts in a relevant field or industry, or other professional translators. Even when translators are aware of such levels of credibility for the terminology used in a project, having discrepancies between the translation memory and the termbase makes both resources less reliable, in turn making the translation process more prone to errors and creating extra work for translators (Nédey et al. 2022, 102).

The usability of a glossary provided to or created by translators can also be impacted by the format and layout used to create the glossary. Bononno (2000, 655) notes that, while translators pay a lot of attention to detail in their work as part of their profession, they tend to view terminology in much less complex terms than terminologists would, perceiving it as "nothing more than a collection of bilingual word lists—a short-term solution to a short-term problem". This view of terminology is likely influenced by the fact that, in many cases, translators do not receive sufficient terminology related resources from their clients, indirectly pushing the burden of term management onto translators (Bononno 2000, 655). The fact that translators are often not paid for performing terminology related tasks (Reynolds 2015, 285) might also encourage translators to see terminology work as a more ad-hoc research task and relying more heavily on translated resources as sources for terminology (Bowker 2015, 311). Time pressure is also likely a contributing factor, as any translator's primary aim in a translation project will be to deliver their translation on time rather than compiling a terminology resource (Bononno 2000, 655).

Still, Bononno (2000, 652) notes that this kind of spontaneous collection of terminological information limits the usability and reusability of the resulting glossary. It appears to be common among translators to compile terminology related findings into word processing software or Microsoft Excel spreadsheets, with many glossaries created this way containing only two columns for source and target language expressions respectively. While using programs a translator is already familiar with to store terminological findings might lower the time needed for a translator to perform such tasks, storing such data is not what programs such as Excel, whose purpose is "to crunch numbers, not words" were designed for (Bononno 2000, 652). As a result, glossaries created this way do not usually reflect the requirements of term bank design and tend to become increasingly harder to use as they grow in volume, since the software used to create them provides only inadequate tools for managing entries, searching and retrieving information, or importing or exporting sets of terminology for use in other programs. Moreover, the information stored in such glossaries tends to be limited, leading to a

loss of information and limiting the potential reusability of the terminology that was collected (Bononno 2000, 652–53).

Reynolds (2015) conducted a survey on the use of terminology in the context of translation projects using translation memory technology or machine translation. He found that, in regard to using terminology in combination with translation tools, translators reported that they set up a terminology related resource before starting to work on a project. Termbase features were reported to be separate from the tool used to edit translations, but could be integrated into the tool. Moreover, termbases were updated and used for QA and other checks during and after working on a project (Reynolds 2015, 283). It was also found that, even when given the opportunity to do so, translators tended not to use means to access the terminology resource directly provided to them via an application programming interface (Reynolds 2015, 284).

In cases where termbase entries conflicted with translation memory entries, translators reported having access to a feature that highlighted key terms within a project, allowing them to prioritize these translations. Automated checks also found and notified translators in instances where a term stored in a termbase associated with the project was not used, the notification only disappearing if a translator inserted a term from the termbase (Reynolds 2015, 285). Being able to see where a term originated from and whether it should be used was also highlighted as important by participants of the survey, with information about terms that were forbidden and therefore should not be used stated as the most important information in this regard (Reynolds 2015, 284).

Checking the translation memory for correct usage of terminology was described as possible but time consuming and complicated in the survey. In order to perform such checks, the translation memory had to be exported from the CAT-tool it was being used in and checks had to be performed using the exported TMX file. Translators working into or from inflectional languages also reported issues with automated QA checks that had trouble recognizing inflected forms of words (Reynolds 2015, 285). Translators and translation companies reported having difficulties in demonstrating the value of terminology work to their clients, leaving this kind of work as unpaid additional labor (Reynolds 2015, 285–86). Software with the ability to store and recognize multiple forms of a term without the need for creating separate entries for each form was reported to be especially helpful by translators (Reynolds 2015, 286).

5.4 Adaptations in commercial settings

COTSOES (2018, 65) acknowledge that translations produced within a translation service provider or as part of an ongoing project can be a source to use in terminology work, however, such terminology should not be used without an additional verification. This recommendation is not always followed in practice, however, since translators tend to rely on pre-existing translations as sources for terminology more readily than terminologists would (Bowker 2015, 311). In general, there appears to be a rift between practices described by terminologists and approaches to terminology work employed by translators. While terminologists might put greater emphasis on recording information about a term and the concept it describes that translators might find unhelpful in their daily work, translators might in turn advocate for including entries in a termbase that a terminologist would not classify as terms (Reynolds 2015, 286).

Various examples of such elements can be found in software localization. While the inclusion of terms commonly found in user interfaces such as “File” or “Options” might be readily recognized as concepts by both terminologists and translators, user interface elements such as “Open file” or “Save as” would likely not be classified as concepts in a terminological sense. Cases like “Convert to Adobe PDF and send via e-mail” would also likely not be seen as a single concept, but a combination of concepts or a phrase (Schmitz 2015, 457). These examples show that in commercial environments, which is the environment software localization or specialized translation are normally done in, the terminological definition of a term as it was given in chapter 4 with a term being “a designation of a concept in a subject field” can be too restrictive (Warburton 2015, 365). Rather than strictly following terminological principles when deciding what linguistic elements to enter into a termbase, Warburton (2015, 366) argues that in commercial settings, additional factors such as the frequency and leveragability of an expression should also be considered. Otherwise, many terms that might not be considered terms according to the typical definition, but that might be important in a specific setting might be overlooked, making it harder to leverage the work put into terminology management to the full extent in order to meet a customer’s needs (Warburton 2015, 366).

The approach suggested by Warburton (2015) does not call for the complete abandonment of terminological principles and methods (Warburton 2015, 373), but could be seen as an effort to acknowledge the fact that translators might have different terminological needs, and therefore use terminological resources in a different manner than terminologists (Reynolds 2015, 286). Yet in commercial as well as terminological settings, the accuracy of the information contained in a terminology resource remains one of the key factors for determining

the value of the resource. Implementing a proper conceptual framework during the creation of a termbase can also decrease the risk of entering confusing or false information (Bononno 2000, 655). It is, for example, very helpful for translators to know if two terms in their source language are synonyms, or to be provided information about whether or not a term is preferred, allowed, or deprecated via metadata entered into a terminological resource (Warburton 2015, 380–81).

Similarly, creating a terminological resource using a database structure and entering information into data categories that have been decided before work on a program begins can help streamline the terminology work, increase the usability of the resulting product, and ensure that it reflects the needs of any specific project (Warburton 2015, 385). When it comes to selecting data categories to use in a termbase, terminologists and translators will likely agree that some data categories such as term, definition, context and subject field are essential, though a consensus might not be so easily found for additional categories or their names (Bononno 2000, 658). The International Organization for Standardization (ISO) compiled an inventory of data categories to promote "[the] use of uniform data category names and definitions employed in resources within the same linguistic domain (e.g. among terminology resources, lexical resources, annotated text corpora)" in order to contribute "to system coherence and [enhance] the re-usability of data". ISO further argues that "[defining] a clear framework for specifying, managing and using data categories will increase interoperability of language resources" (ISO 12620 2022).

The inventory of possible data categories created for this standard is huge, but it should not be understood as a standard in the sense that it prescribes which data categories should be used in any given terminology resource (Bononno 2000, 647). This can also be inferred from the fact that the scope of the standard is stated as providing "requirements and recommendations governing data category specifications for language resources" and "[describing] the structure and content of data category specifications" (ISO 12620 2022). Bononno (2000, 647) recommends using the standard and its inventory of data categories as a "registry against which database designers can correlate existing or planned systems", but also emphasizes that using the inventory and selecting fitting categories from it can go a long way in promoting a more universal structure for the management of terminological data in the language industry.

Looking at ISO 12620 and the data categories laid out in the standard this way, it becomes apparent that it is possible to modify existing categories or create new ones, which can be necessary to fulfill the needs of a specific project. For example, Schmitz (2015, 459) argues that, while traditional terminological data categories such as the ones laid out by ISO 12620 work well in the context of translating documentation material, in the context of web

pages or online help resources associated with a software, managing user interface terminology requires additional data categories, because terms and the concepts they represent are not always used in all parts of a user interface in the same way and might require different translations depending on the specific place they are used in. Using such reasoning as a starting point, the Cologne University of Applied Sciences carried out a national founded project named Dandelion (Data Modeling and Data Exchange for Software Localization) from June 2005 to March 2007 with the aim to "develop methods for more adequate documentation and management of software user interface texts in localization-specific tools and formats" (Schmitz 2015, 459). During the project, a data model for software-specific terminology management was designed and the project team specified adequate data categories to be used within that model. These data categories included for example a category called "Localization unit type" which could include information such as "menu", "menu item", "dialog box", "error message" or "tool tip" and give a translator more information about where in a software a term is to be used. The "Localization unit string ID", which is the number assigned to a string by a localization tool was also suggested as a category, as were the "Development environment subset" and the "Project subset" (Schmitz 2015, 459–60). The data model and the data categories created by project Dandelion were implemented by SDL-Trados, one of the industrial partners of the project, in the 2011 version of their software MultiTerm (Schmitz 2015, 460), and the data categories were also included in the ISO Data Category Registry as proposals, with the category deemed most important by the project team, the "L10N-Type" category even being included in the annex of ISO 30042, albeit with its title changed to "term location" in 2008 (Schmitz 2015, 461).

In order to use terminology management as effectively as possible in a commercial setting, Warburton (2015) argues that the criteria used to determine what linguistic elements are classified as terms should also be broadened. A survey conducted by the Localization Industry Standards Association (LISA) found that a term is often defined as "any linguistic expression that needs to be managed in order to serve various communication and technological needs" such as implementing controlled authoring or CAT-tool use in commercial settings. This leads to the inclusion of many linguistic elements that would normally not be considered as terms into commercial terminology resources. (cf. Warburton 2015, 377). Such elements can include industry specific phrases, such as the examples provided by Schmitz (2015) in the context of software localization. Moreover, expressions that might normally be considered elements of general language might be entered into a commercial termbase to implement controlled

authoring, and a higher number of names or titles of organizations, programs, services, or documents might be entered, as well as sentence fragments or even entire segments of text, for example text contained in copyright statements or legal notices. Generally, linguistic elements that need to be translated consistently either because of their high visibility and the frequency at which they appear in texts, or because of a need to comply with existing industry standards become applicable as term candidates in such environments (Warburton 2015, 378–79).

Based on these observations and findings reported by Ronan Martin in 2011, according to whom one of the most important factors to consider when conducting any sort of terminology work is the potential to reuse the data compiled in one project in other settings after a project has concluded, and who presents criteria for evaluating termhood such as term frequency, pre- and post-modifiers of a term and term embeddedness (cf. Warburton 2015, 379), Warburton (2015, 381) proposes four criteria that could be used to determine the termhood of linguistic elements in commercial settings in addition to the classical criterion for termhood, which should nevertheless be considered "a guiding principle".

The first criterion is the *frequency of occurrence* of a term. Terms that occur frequently in a text or across texts produced by a company or organization are more likely to become a source of inconsistencies both in the target language and in translations if they are not managed. This includes spelling variations, which not only limit the efficiency of translation memories, for which a different spelling of a term can make a difference between an exact and a fuzzy match, but which can also become lexical variations in translation if a translator assumes that the different spellings are used to signify different words, or if they confuse a term for a new one because of a spelling variation. On a practical level, terms that occur frequently are also generally more likely to be used by translators working with a terminology resource often, increasing the value of the terminology and maximizing the usefulness of the resource (Warburton 2015, 381–82).

The criterion of frequency of occurrence is linked to another criterion proposed by Warburton (2015, 383), namely that of *visibility*. This criterion is proposed to include terms that appear prominently in the material produced by a company or organization, for example words or slogans displayed on websites or within software user interfaces, as well as words that are part of packaging material or serve other marketing related purposes. Generally, Warburton (2015, 383) argues that the more prominently a term is featured in a product or marketing material associated with it, "the more important it is to get it right, both in the source language and in all target languages". Managing highly visible terms can also help a company or organization to ensure that they only use terminology that does not violate trademarks or

copyright, and that there are no issues with safety and legal notices. Data categories could be added to a resource to specify, for example, that a certain term is part of a marketing campaign and therefore should be translated a certain way (Warburton 2015, 383).

Another criterion proposed by Warburton (2015) is that of *embeddedness*, which is carried over from the criteria proposed by Martin (2011) and refers to "a term's productivity in forming longer multiword terms" (Warburton 2015, 382). This means that a single or multiword term is frequently used to create new, longer terms, as can be demonstrated by looking at occurrences of the term "sustainable development" which, in glossaries used by the World Bank, is used to form various other expressions such as "ecologically sustainable development economics", "environmentally sustainable development" or "World Summit on Sustainable Development". By including not only each of the long multiword expressions using the term "sustainable development" but also this term itself into a termbase, translation consistency for a large number of terms, as well as consistent translations of similar multiword terms using "sustainable development" that might be created in the future can be ensured (Warburton 2015, 382–83).

Finally, Warburton (2015) proposes the criterion of *translation difficulty* as the fourth criterion to be considered when determining termhood in a commercial setting. While this criterion might appear obvious and self-explanatory, since "[terms] that are difficult to translate are obvious candidates for a termbase that is used by translators", translation difficulty can originate from various properties of a term (Warburton 2015, 383). When translators encounter a term that is difficult to understand or has an unclear meaning, they will generally do research to clarify the meaning of said term and find an adequate translation. Problems can arise when several translators carry out this research task. Moreover, similar looking terms in the source language can create translation problems if a translator assumes that they are synonyms of each other when they actually are not. If incorrect translations find their way into a project due to such a misunderstanding, fixing them can be a time-consuming endeavor, especially if the mistake is only noticed in a late stage of the project (Warburton 2015, 383). Long multiword terms in which the relationship between the individual words they contain is not made clear, for example by markings such as prepositions, can also be a source of translation difficulty. This problem becomes especially apparent when translating from a language that allows long strings of adjectives and nouns to be used without prepositions, such as English, into one that does not, such as French. (Warburton 2015, 383–84). Warburton (2015, 384) illustrates this problem by showing that the term "Global Food Crisis Response Programme" could be translated into French in two different ways depending on whether the program in question refers to a program

responding to a global food crisis or a global program responding to a food crisis and points out that in other cases even more translations might be possible. Such long multiword terms should therefore be entered into a termbase to minimize translation inconsistencies. This holds true even if embedded terms contained in a longer term are already included in the termbase since, as the example shows, the relationship between each embedded term might not always be apparent. The inclusion of multiword terms can be more crucial for some languages, for example compositional languages such as German or Finnish, while in other languages the risk of them causing inconsistencies might not be as high, leading to variations in the coverage of terms for each language represented in a termbase (Warburton 2015, 384).

Following from these discussions, Warburton (2015, 386) also argues that there can be no single, standardized workflow for terminology management in commercial environments, since workflows always "[need] to be customized to the particular conditions, users and technologies in the company". Another concern in commercial settings is to automate terminology work as much as possible in order to maximize productivity and be able to stay competitive (Warburton 2015, 387).

5.5 Other applications: crowdsourcing and review translation

Systematic terminology work is always a collaborative task since, as discussed in chapter 4, terminologists have to work with subject matter experts to verify their findings or to clarify concepts and definitions. Karsch (2015) argues that tasks such as creating a new or choosing an existing designation for a concept, which are usually performed by a terminologist, could be enhanced when terminology experts are supported by a crowd that is suited for the terminology task at hand. Such an approach could be considered as crowdsourcing, an approach that can be defined as "the act of taking a job traditionally performed by a designated agent (usually an employee) and outsourcing it to an undefined, generally large group of people in the form of an open call" (cf. Karsch 2015, 296). Crowdsourcing is already applied in creative industries and for problem solving tasks (Brabham 2008, 75), and implementations usually rely on some manner of web-based infrastructure to facilitate communication and interaction between participants (Brabham 2008, 87).

Regardless of the aim of a crowdsourcing endeavor, which, when applied to terminology work, would be having tasks that are usually performed by a terminologist performed by a crowd of people, the type of crowd that is to be assembled must be determined first. Crowds can be either closed, meaning that membership is limited to people selected by the company or

organization organizing the crowdsourcing effort, open, meaning that anyone who wishes to can participate in crowdsourced tasks, hybrid, meaning that an open or closed crowd is supervised by in-house experts, or moderated wherein a crowd is open but moderated by the company or organization in some way (cf. Karsch 2015, 296). Karsch (2015, 298) identifies 13 tasks typically associated with terminology work, including suggestion, collection and review of term candidates, checking a database for doublettes, and providing and processing feedback for terminological entries. She then groups these tasks into tasks associated with terminology production and tasks associated with quality assurance and argues that some of them are suited to being performed by a crowd while others are not.

Regarding terminology production, Karsch (2015, 299) argues that suggesting, reviewing and selecting term candidates are well suited to being performed by a crowd. Even in traditional work setups, terminologists do not decide which term candidate might be the most appropriate to use on their own but confer with subject matter experts. Having a crowd, in a best-case scenario even a crowd made up of subject matter experts, support a terminologist in their research about term candidates can not only help improve suggestions made for term candidates, but also increase the suitability and thereby the longevity of the term that ultimately gets chosen. Administrative tasks such as collecting and documenting relevant information or releasing finished entries should not be performed by a crowd, since it would require a lot of preparatory work and communication to have these tasks performed by a group of people and a single person can handle them more efficiently (Karsch 2015, 299).

According to Karsch (2015, 301), quality assurance again contains tasks that lend themselves well to crowdsourcing as well as tasks that should be performed by a single individual, preferably an expert in the field of terminology. Checking the content of a database and providing feedback about it can be easily done by a group of people using the database, who will notice problems with it during their work and only require an appropriate way to communicate their feedback. Processing this feedback, on the other hand, requires a person with terminological expertise, since it involves evaluating the work performed by the crowd and, especially in prescriptive or normative settings, might require the person carrying out the task of implementing feedback to make sure specific requirements are met by each term and entry (Karsch 2015, 301).

While suggestions made by Karsch (2015) present more of an application of new methodology *to* terminology work rather than an application of terminology work itself, Rodrigues Rebechi et al. (2022) explored the usability of glossaries in the translation of restaurant reviews from English into Portuguese. Rodrigues Rebechi et al. (2022, 37) argue that,

even though TV programs, books, blogs, and other media relating to food have been "selling like hot cakes", there is a shortage of resources available to translators working in this field, where most material is produced in English. Relying only on general language dictionaries tends to be insufficient for this domain, and specialized glossaries are not always properly created or are not available to translators at all. This creates unique translation problems since, while in the translation of recipes terminological consistency is key to enabling the user of a translated recipe to recreate a dish, restaurant reviews tend to rely on synonyms, metaphors and domain specific idiomatic expressions more heavily (cf. Rodrigues Rebechi et al. 2022, 37).

Rodrigues Rebechi et al. (2022, 38) assumed that "by relying on general language dictionaries, machine translation, and previous knowledge, translators tend to render terms and phraseologies typical of restaurant reviews (…) with the (…) equivalents (…) which come to mind more easily" due to orthographic similarities between the source and target language or due to being the first meaning found in a general dictionary. Translators are likely to know more than one translation equivalent for any given phrase, but might only feel confident to choose equivalents that are less likely to be perceived as atypical by their target audience or client (cf. Rodrigues Rebechi et al. 2022, 38). Based on this assumption, Rodrigues Rebechi et al. (cf. 2022, 38) used corpus linguistic methods to build the "Dicionário Gastronômico" (Gastronomic Dictionary) as an open access bidirectional online resource for looking up terms and phrases typically found in restaurant reviews along with their respective translations and authentic examples for the language pair English-Portuguese. Such a resource is assumed to be useful based on previous findings by Rodrigues Rebechi et al. (2022), which state that restaurant reviews contain "patterned and less frequent combinations of words, in such a way that terms and phrases are immediately recognized" (cf. Rodrigues Rebechi et al. 2022, 39). Such terms and phrases can be considered linguistic conventions of a genre, meaning that readers expect to find certain terms and phrases in a text they read. This in turn means that, while the genre of restaurant reviews remains a creative one and creating a linguistic resource reflecting any creative phrase an author might come up with is not feasible, creating a resource that helps translators in rendering conventional terms and phrases of a genre would help them to produce appropriate translations (Rodrigues Rebechi et al. 2022, 39).

In a study presented at the NeTT conference 2022, Rodrigues Rebechi et al. (2022) then tested the Gastronomic Dictionary in a translation task assigned to 22 second-year Languages undergraduates who were majoring in Portuguese-English translation at the Federal University of Rio Grande do Sul (UFRGS), Brazil at the time to see whether access to the dictionary would influence the translation decisions made by the students. Participants in the study were asked

to complete two tasks. After an introduction to the genre of restaurant reviews, they were assigned sentences taken from restaurant reviews written in English to translate into Portuguese. During the first task, they were not given access to the Gastronomic Dictionary, but were allowed to consult any translation resources (such as machine translation and general language dictionaries) that they usually consulted when translating.

After completing this task, participants were introduced to the Gastronomic Dictionary and its key differences from other sources before being asked to perform another translation task on different sentences extracted from restaurant reviews while being able to consult the Gastronomic Dictionary (Rodrigues Rebechi et al. 2022, 38). Participants were given access to Google Sheets containing the sentences they were meant to translate in each step and carried out the translation activity as a homework, so while Rodrigues Rebechi et al. (2022, 40) stated that students were "encouraged to look up the Dictionary" for the second translation task, they had no way of guaranteeing that they actually did. In order to be able to analyze the efficiency of the Gastronomic Dictionary, meaning the degree to which it was used by participants during the second translation task, Rodrigues Rebechi et al. (2022, 40) analyzed matches for participants' translations with the Gastronomic Dictionary, where every instance where a key word or phrase contained in the Gastronomic Dictionary was translated using a suggestion found in the resource was considered a match.

Comparing matches found in translations made with and without access to the Gastronomic Dictionary, Rodrigues Rebechi et al. (2022, 42) found that participants produced different translations when provided access to the Gastronomic Dictionary, showing that access to this resource "provided the students with options that they had not thought of when they had no access to this reference material" and thus enabled participants to "not only render the sentences with the appropriate terminology, but also maintain the tone of the source text in the target text". However, it was also noted that in many cases, translation suggestions found in the Gastronomic Dictionary were not adopted by participants. One explanation for this could be that participants mainly relied on the new resource to look up terms they were unfamiliar with, while not using it to check alternative translations for terms they already knew (Rodrigues Rebechi et al. 2022, 42). If this explanation was assumed to be correct, Rodrigues Rebechi et al. (2022, 42) concluded that "a more practical way of being presented to other choices could become the icing on the cake". Rodrigues Rebechi et al. (2022, 42) stated that their findings are limited by the fact that they had no way of guaranteeing that participants would use the Gastronomic Dictionary since they carried out the translation task as a homework, and by the small sample size which limited the viability of statistical analysis. Nevertheless, the general

usefulness of the Gastronomic Dictionary as a resource to help translators produce translations of restaurant reviews that adhere to terminological conventions of the genre was indicated at a sufficient level to make the next step in their research the adaptation of the Gastronomic Dictionary to a termbase usable in a CAT-tool to enable translators "to look up terms without disrupting their translation process" (Rodrigues Rebechi et al. 2022, 44).

6. Terminology management in games localization

Having laid the foundation of how the game localization process is set up as well as of what terminology work is and how it is structured according to the principles of terminology science, as well as how it is implemented in translation practice, this chapter aims to lay out how the process of managing terminology is integrated into the process of localizing a video game. Zhang (2014, 200) claims that "[Terminology management] has not previously been widely performed in the field of game localization, which may be due to the general lack of awareness from both publishers and localization providers of the terminological issues surrounding games and the potential benefits of managing terms", but this chapter will demonstrate that there are processes and methods in place to manage terminology in video games.

6.1 Game documentation, glossary creation and communication

Feil (2020, 22) cites the Game Design Document, a document detailing the features, story and characters of a game, as well as the platforms the game is planned to release on, and other information, as the essential piece of documentation the development team and writers use to stay informed about various aspects of the game. Most development teams, however, do not rely on this document alone, but create additional documents to help with different aspects of game development. For writers, one such document that is referenced a lot can be a "world guide" which provides information about important NPCs, the geography of the game world, and the history of the civilizations that inhabit it (Feil 2020, 28). Feil (2020, 28–32) also recommends a number of other documents writers can create to help themselves keep track of various aspects of the game. While a glossary is not among the recommended resources, Feil (2020, 32) does recommend that writers create "Lists and lists and lists" to keep track of "anything relevant that might help inspire and inform [the] need to create worlds from scratch", such as potential names for characters, places in the game world, creatures a player might encounter, and so on.

Zhang (2014, 208) similarly points out that some terms found in a video game, especially names of characters, weapons, items, or locations, require special attention during the localization process, since translating them consistently is especially important and inconsistencies in this area can lead to confusion among players. In order to ensure consistent translations of such terms, Zhang (2014, 210), recommends that a terminologist should extract and collect terms before a video game localization project begins, and suggests that this could also be used as a means to identify terms that might cause issues with regards to cultural

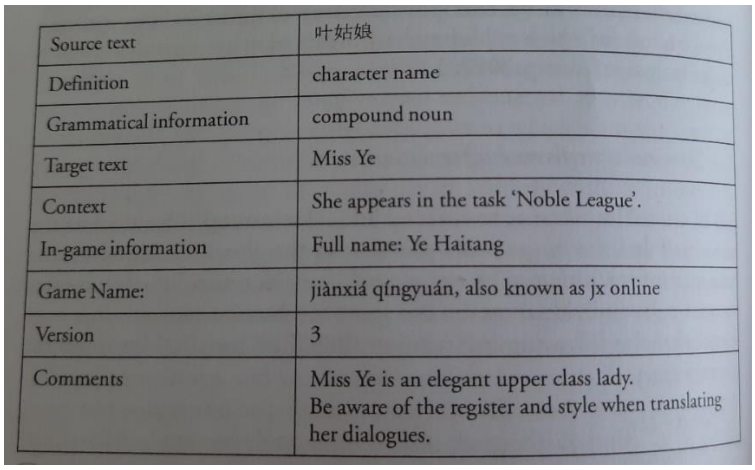
connotations or when aiming to obtain a specific rating from a relevant board for the localized version of a game. Terminology could be collected using Microsoft Word or Excel Spreadsheets if the scale of the project is not too large to render these formats inefficient (Zhang 2014, 206). Zhang (2014, 204) points out that, if game developers started terminology work during the design phase by collecting relevant terms, such a collection could be used to build a terminology database by the localization team prior to starting the translation process, which would save time during the actual translation work.

The importance of glossaries during the video game localization process is also highlighted in an interview conducted by Chandler and Deming (2012, 114–18) with Richard Honeywood, a former Global Localization Manager at Blizzard Entertainment. Honeywood described the first two stages of the localization process as "Familiarization" and "Glossary and Style Guide Creation". The aim of familiarization is to inform the localization team about the content of the game, it's setting, characters, and other aspects relevant for localization by ideally giving them the chance to play parts of the game and at least providing them with design documentation and other material (Chandler and Deming 2012, 114). While a glossary can be part of this documentation, translators can also create their own glossary from other kinds of material they receive (Chandler and Deming 2012, 115). Chandler and Deming (2012, 157) recommend creating a glossary in the context of a video game localization project, which could have three columns, including the term, its context within the game and a sample sentence respectively. Additionally, Honeywood pointed out that translation memories can be a useful tool for saving time and money during the localization process. Especially towards the end of a project, the amount of time that needs to be spent checking and updating the translation memories will be minimized, while at the same time translators will profit greatly from the data stored in the translation memories, which will allow them to work more efficiently. Translation memories should therefore be maintained and stored for future projects. This task should be handled by an in-house expert at the development company, but can also be outsourced to a translation vendor company (cf. Chandler and Deming 2012, 110).

Zhang (2014, 207–8) proposes adding more information to a glossary associated with a video game and suggests that a glossary entry should include the source text, a definition, grammatical information, such as the gender and word class of the term, the context in which the term is used in a game, meaning its function and location within the game, and additional in-game information, such as whether a given term is the name of a specific weapon used by a specific character. Moreover, information about the game name and version should be added to

be able to place the term in relationship to other projects, and there should be room for comments.

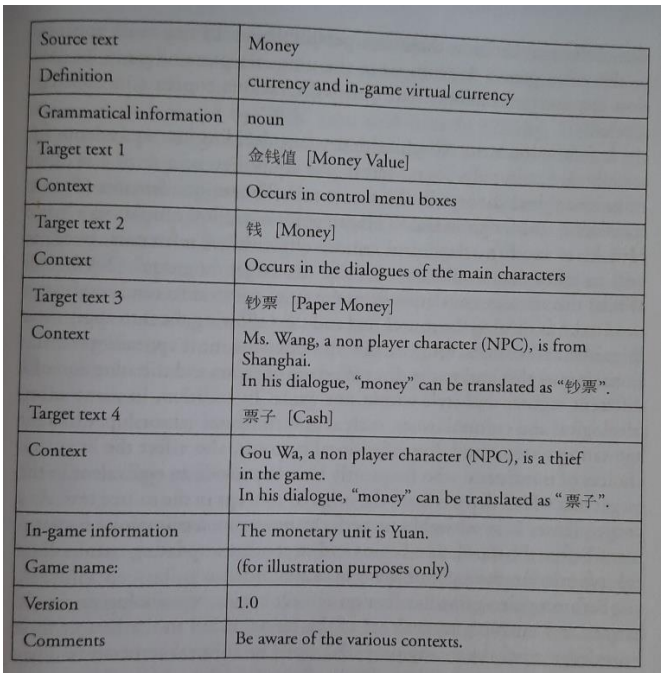
Since Zhang's focus is on multilingual term management, adding a target language translation for each source term, as well as space to collect translation variations and their context, is suggested as well (Zhang 2014, 207). Zhang (2014, 208) provides the following example of what a glossary entry for an in-game character could look like:



Source text	叶姑娘
Definition	character name
Grammatical information	compound noun
Target text	Miss Ye
Context	She appears in the task 'Noble League'.
In-game information	Full name: Ye Haitang
Game Name:	jiànxiá qíngyuán, also known as jx online
Version	3
Comments	Miss Ye is an elegant upper class lady. Be aware of the register and style when translating her dialogues.

Figure 2: Entry for a character in a bilingual glossary (Zhang 2014, 208)

In the layout suggested in Figure *2*, some information about the character besides her name is included, for instance the in-game quest players encounter the character in, and some information about her social standing with a reminder to use appropriate speech registers. Zhang (2014, 208) also point out that, depending on the content of a specific game, there can be a need to manage "slang or regional expressions (…) as terms [in order to provide] guidance for translators and unifying the register and style of in-game dialogues and background stories". The following structure for adding variations for the translation of a term is suggested:



Source text	Money
Definition	currency and in-game virtual currency
Grammatical information	noun
Target text 1	金钱值 [Money Value]
Context	Occurs in control menu boxes
Target text 2	钱 [Money]
Context	Occurs in the dialogues of the main characters
Target text 3	钞票 [Paper Money]
Context	Ms. Wang, a non player character (NPC), is from Shanghai. In his dialogue, "money" can be translated as "钞票".
Target text 4	票子 [Cash]
Context	Gou Wa, a non player character (NPC), is a thief in the game. In his dialogue, "money" can be translated as "票子".
In-game information	The monetary unit is Yuan.
Game name:	(for illustration purposes only)
Version	1.0
Comments	Be aware of the various contexts.

Figure 3: Entry for a term with variations (Zhang 2014, 209)

In the example provided by Zhang (2014, 209), different variations for translating the source term "Money" are listed and the context in which each translation is meant to be used is specified, in this case different characters use different terms when talking about money and another term is used in in-game menus.

Regardless of what terminology work is performed prior to the start of a localization project, questions asked by translators during the actual work on the project would lead to a need for continuous expansion of terminological information (Zhang 2014, 207). During the video game localization process, the localization team benefits greatly from having the ability to ask questions to the writers and developers of the game (Dealessandri 2020), especially in cases when translators disagree on the appropriate translation of a term in a given context and need clarification from someone with more information about the terminology of the game (Zhang 2014, 210). Chandler and Deming (2012, 116) similarly recommend keeping the development team available to answer questions that might arise during the localization process.

Glossary creation or management is not part of the services offered by XLOC, a Content Management System marketed to video game developers. XLOC is part of the Keywords Studios group (XLOC Globalization Solutions A Keywords Studio 2023b), one of the largest providers of translation services for the video game industry (Slator 2019, 14), and is geared towards managing assets associated with a game, as well as streamlining the localization

process and providing a means to organically integrate it into a game's development cycle. Notably, the services offered by the company include "Translation Memory", "Translation" and "Localization QA" (XLOC Globalization Solutions A Keywords Studio 2023b), but do not mention terminology management or the creation or management of termbases or glossaries. In the FAQ section of their website, the question of whether XLOC offers "a dictionary of suggested translation terms" is answered by explaining that

> *XLOC incorporates and adheres to your unique game terms and does offer a glossary of lookups and matches, but keep in mind that XLOC is a process management solution rather than a traditional translation service.* (XLOC Globalization Solutions A Keywords Studio 2023a)

No further information about the structure of these glossaries or their content is provided.

6.2 Terminological issues during video game localization projects

Terminological inconsistencies can creep into a localization project due to the common setup of having multiple translators work on the same file at the same time (Zhang 2014, 203). As an example, Zhang (2014, 203) points out the inconsistent translation of a character name in the English version of the Chinese online game 剑侠情缘 3 (Jiànxiá qíngyuán 3, also known as Jx3 online). The character in question is called 叶姑娘 (yè gūniang) [Miss Ye] in Chinese, but the English version refers to the same character as Miss Ye, Ms. Ye, Sister Ye and Lady Ye (Zhang 2014, 203). While the first two variations could be considered spelling variations and are unlikely to cause issues with the understandability of texts they are encountered in, the variations "Sister Ye" and "Lady Ye" have the potential to confuse or frustrate player, who might wonder if these are separate characters (Zhang 2014, 203–4).

A similar example can be found in *Persona 5 Royal*, a game published by ATLUS (2022), in which players can purchase and interact with various items to influence their character's abilities. One such item is a book which teaches players a skill that allows them to gain more experience when interacting with movies in the game. However, the name of this book changes depending on where it is mentioned in the German version of the game. As can be seen in *Figure 4*, when players purchase the book from an in-game bookstore, it is sold as "Kineastische Seele". If a player has the main character watch a movie after reading the book, however, the name changes to "The Craft of Cinema".

Figure 4: Different names for the same item in *Persona 5 Royal*

Item descriptions can also be affected by inconsistencies. An example can be found in *The Legend of Zelda: Tears of the Kingdom*, which was published by Nintendo (2023). In the game, players can attach different items to their weapons to make them stronger or add various effects to them. One such item is the eyeball of a specific kind of monster, which, if attached to an arrow, makes this arrow follow its target until it hits it. Items in the game can be registered into a compendium, where players can read up on the effects an item has when attached to a weapon. The description of an item can also be checked by selecting an item in a player's inventory. Figure *5* provides an example of such an entry.

Figure 5: Compendium-entry for a Keese Eyeball in *The Legend of Zelda: Tears of the Kingdom*

Several variations of these eyeballs exist within the game, but all of them grant the same targeting-ability to an arrow. This fact is less clear in the German version of the game, however, where the descriptions of the eyeballs, specifically the sentence "Attach one to an arrow to grant a homing quality to the arrow" (Nintendo 2023) was translated inconsistently, as can be seen in Table *1*.

Table 1: Compendium translations for Keese Eyeballs in *The Legend of Zelda: Tears of the Kingdom*

Item	English Compendium	German Compendium
Keese Eyeball	These mysterious orbs scan their surroundings. Take advantage of their glaring awareness, *and attach one to an arrow to grant a homing quality to the arrow*.	Eine mysteriöse Kugel, die Daten in ihrer Umgebung erfassen und analysieren kann. *An einem Pfeil angebracht lässt sie diesen sein Ziel von selbst verfolgen*.
Fire Keese Eyeball	Fire Keese eyeballs are imbued with heat and are useful in making elixirs. *Attach one to an arrow to grant a homing quality to the arrow*.	Das Hitze abstrahlende Auge eines Feuer-Flederbeißers. Nicht nur für Medizin geeignet, *sondern auch zur Herstellung eines Pfeiles mit höherer Trefferwahrscheinlichkeit*.
Ice Keese Eyeball	Ice Keese eyeballs are imbued with freezing power and are useful in making elixirs. *Attach one to an arrow* to *grant a homing quality to the arrow*.	Das vor Kälte klirrende Auge eines Eis-Flederbeißers. Nicht nur für Medizin geeignet, *sondern auch zur Herstellung eines Pfeiles mit höherer Trefferwahrscheinlichkeit*.
Electric Keese Eyeball	Electric Keese eyeballs are imbued with electric power and are useful in making elixirs. *Attach one to an arrow to grant a homing quality to the arrow*.	Das elektrisch knisternde Auge eines Elektro-Flederbeißers. Nicht nur für Medizin geeignet, *sondern auch zur Herstellung eines von selbst das Ziel suchenden Pfeils*.

Table *1* shows that, while in English all eyeball-descriptions end with the same sentence, this sentence was translated in three different ways in German. The content was also slightly changed in the translation of the descriptions for the Fire and Ice Keese eyeballs, which state that the item can be used to "make an arrow with a higher hit probability" rather than an arrow that "chases its target automatically" like the Keese eyeball or an arrow that "looks for its target automatically" like the Electric Keese Eyeball.

Translators working on video games regularly point out that the task can be challenging, requiring them to, for example, research specific jargon for a specific region or time, or read books published during a certain time to get a feeling of the way people were speaking back then. This research can significantly lower the translation speed of even experienced translators and they profit from working in a team of translators to bounce ideas off each other (Dealessandri 2020). Especially in projects with tight timeframes on shipment dates, priority during checks on finished translations can be given to finding and fixing errors that might hinder the gameplay, leaving other translation issues unresolved. This can however, lead to players of a game complaining about errors they found in localized versions of a game online (O'Hagan 2020, 97). To minimize the negative effects of such circumstances on a localization project, it is recommended for video game translators to possess "a degree of gaming experience and related popular culture knowledge" which helps them better understand the strings they are presented with and can help them make better translation decisions (O'Hagan 2020, 97).

Development companies appear to be aware of this need for gaming experience, as can be exemplified by the job advert posted by Supergiant games to find translators for *Hades II*, which specifies that candidates should have "2+ years experience and 1+ shipped games as a translator in [their] language" and "Experience playing **Hades** and Greek myth translations in [their] language" (Supergiant Games 2022). Additionally, applicants are expected to have more "general" translation proficiency, such as "Conversational, colloquial fluency in English and one of [the] supported languages" or "Experience using collaborative tools on an international translation team" (Supergiant Games 2022).

When deciding on the best way to translate specific terms, in addition to accuracy and consistency, considerations for balancing "accuracy vs. consistency vs. nostalgia" were expressed by Koji Fox, the Co-lead World and Lore Developer working on the MMORPG *Final Fantasy 14*. Since this MMORPG does not simply borrow a *Final Fantasy* aesthetic, but is a numbered entry in the long running series of RPGs, putting in characters that also appeared in other entries of the series can be a challenge for the team. This can concern questions such as whether to use a mistranslation of a name that was used in a past entry and is therefore

something many people might remember from playing the game the character first appeared in, or use a new, more accurate translation or transcription of the character's name. Similarly, summonable characters have been called "Espers" or "Eidolons" in different entries of the series. Fox's team needs to get the approval of a committee of experts when making decisions on the translation of the names of particularly important characters, but ultimately always tries to make their choices while aiming "to balance what is best for FF14 (as its own entity), while paying the proper respects to what has come before" (Prell 2018).

6.3 The treatment of terminology during the localization of *Aion*

Kim (2019, 53) describes that translators received reference material, including a style guide and existing translations that were available and send to translators in the form of Microsoft Excel-sheets to familiarize themselves with the game before translation work on *Aion* began (Kim 2019, 53). The game had previously been translated from Korean using English as a pivot language, but when Kim was brought on to work on the project, this strategy had been abandoned by a new localizing vendor in favor of translating the game directly from Korean into German (Kim 2019, 50–51). Major content updates were handed to the team for translation in six to eight month intervals, with smaller batches of content being translated between the major updates in irregular intervals (Kim 2019, 52).

During the localization project, the team had to ensure their translations were consistent with previously created translations in terms of style and terminology. For this purpose, the TM with its concordance feature, as well as the termbase of the CAT-tool the team were working with, were described as helpful (Kim 2019, 70). "Key terms that were in use a lot" could be saved to the glossary of the CAT-tool the translators were working with (Kim 2019, 72). This was described as being especially helpful, since terms saved in this manner could be added with a simple command and the risk for spelling mistakes as well as the time needed to translate a term and input the translation were reduced (Kim 2019, 73). There is, however, no mention of the use of this feature being mandatory, or the entries created by translators being monitored within the termbase feature. The criteria that would make a term a "Key term" are also not specified. Terminological consistency with existing translations was mainly ensured by having translators use the concordance search feature of their CAT-tool to compare a string they were working on with strings already saved in the translation memory of the project (Kim 2019, 71). After the translation of a batch was finished, the CAT-tool was used to run a check on the translation and ensure that every string had been translated (Kim 2019, 74).

Terminological problems could arise during the localization work if a translator assumed a term they encountered to be new and did not perform a concordance search to check for existing translations, but instead came up with a new one. This caused variations in the translation of a term (Kim 2019, 76). If such inconsistencies were not found early on, they could persist until well into the localization process and could result in the usage of incorrect terminology that has not been authorized by the client (Kim 2019, 78). Kim (2019, 78) presents examples of such inconsistencies that came up during the localization of *Aion* he was involved in.

For instance, the Korean word for the item "상인의 천막" (*sang-in-ui cheonmag*), which is translated as "Merchant's Tent" in the English version of *Aion* (Aion Wiki 2023), was translated into German in three different ways as "Zelt der Bergleute", "Zelt der Händler" and "Zelt der Kaufleute" (Kim 2019, 78). The first variation makes the tent into a "Miner's Tent" and is likely the result of the translator confusing the similar words for "Miner" and "Merchant" in Korean. This instance can therefore be considered a "plain translation mistake" (Kim 2019, 78). The other variations both use technically correct renditions of the word "Merchant" in German, but still presented a problem within the localization project, since the name of this item should be translated consistently (Kim 2019, 78).

As another example, Kim (2019, 78) provides the translation of the word "유피티네아" (*yupitinea*), which is a place in the game that is called "Oriata" in English. This word was supposed to be translated as "Upinetia" in German, which is similar to a simple transcription of the Korean word but is spelled slightly different to make the word easier to pronounce for a German player base (Kim 2019, 79). During the localization project, the name was translated as "Oriata", "Upinetia" and "Jupitinea". While Oriata was most likely carried over from a translator familiar with the English version of the game or from an older English source segment, "Jupitinea" is an alternative transcription of the Korean word (Kim 2019, 78–79). Kim (2019, 78) emphasizes that the correct translation for each of these two terms would have been available as part of the translation memory and the mistakes were most likely caused by translators not looking up the terms.

When the team encountered a new term in a translation batch that had an unclear meaning or for which the translators were unsure about the best way to translate it, they had the option of creating "Q&A-lists" (Kim 2019, 73). These lists were then forwarded to the localization project manager who in turn forwarded them to the client and got the answer back to send it to the translators (Kim 2019, 73–74).

After translations were finished, a file would first be checked automatically using the CAT-tool function to ensure that all strings had been translated and that there were no orthographical or grammatical errors. When the deadline for a task allowed for it, this would be followed by a human revision by a dedicated team member. In other cases, a file would be delivered directly to the client, who would perform additional in-game localization tests regardless of whether a human revision had been performed on a file (Kim 2019, 74–75).

When working on translations for *Aion*, the team had to translate a great number of terms that were specific to the fantasy-setting of this particular game. However, in addition to such terms, Aion also contained more general "computer-, video game- and IT-terminology" (Kim 2019, 79). These terms could also be used in abbreviated forms to facilitate more effective communication or to save space. Moreover, due to the setting of the game involving war and fighting, military terminology such as military ranks, names of military units, and weapons were also present in the game texts (Kim 2019, 79)

6.4 The treatment of terminology at Ubisoft

At Ubisoft, while it is not mandatory for freelance translators to use the tool (MD 210-211), memoQ is used by the company itself and the automated QA system integrated into the tool is used to ensure that "terminology that matches terminology which has been previously translated" is used during the translation process (MD 114-115). Using the termbase feature integrated into memoQ is optional for translators, as using it efficiently requires a lot of manual labor and is therefore not a requirement made by Ubisoft. Instead, automated QA-checks are carried out to spot inaccuracies within the translation at a higher level of accuracy than a human reviewer would be capable of, considering the large volume of the texts that are translated (MD 113-119).

Members of the localization staff at Ubisoft are part of the source language writing process and appear to have the opportunity to give advice regarding localization issues early in the production process. This helps with the localization process, since the localization team is familiar with a games content and there are established contacts among the different teams (MD 9-13). Using extra resources or redistributing resources to manage terminology is not a pressing concern at Ubisoft at the moment. As was explained during the interview:

> *[With] the amount of games that we have and the quantity of terms that we would have, there probably would be a whole service dedicated to maintaining termbases across all languages that we have and historical data and everything and we found that we still achieve the quality that we want in terms of terminology and putting that much*

> *emphasis on this would pull resources from other, probably more valuable things for us at the moment.* (MD 176-180)

Managing terminology does not appear to be seen as a solution to any pressing issues that currently need to be solved in the localization process, so no additional resources are used to explore this avenue. It was also noted that, while localization quality can be aided by ensuring translators have adequate time to work on a task, this metric can only help improve quality up to a certain point, because most of the translators working on the localization of a game tend to be freelancers who need to work for other clients as well to make a living, so giving them a lot of time to complete a task is not a guarantee that they will spend the extra time working on the given task (MD 260-265).

Nevertheless, while game design documents also seem to be an important resource used within the development process at Ubisoft (MD 352-355), it was reported that there is also a system for managing source language terminology which takes the form of "a very basic glossary with a definition and explanation of what the term means" (MD 46). The source language glossaries at Ubisoft appear to not be used extensively and localizers sometimes spot inconsistencies in the English writing once they start working on the game, so, from a localization point of view, there is a case to be made for the system currently in use being not strict enough (MD 46-50). This aspect of the writing process is also a current target for optimization, aiming to implement more automated checks for terminology, linking terms in the script to their glossary entries and allowing for easier lookups. The main aim of such a system would be tracking changes made to terms during the writing process (MD 53-57).

In Addition to glossaries, writers at Ubisoft also have access to style guides, but neither resource is being used as part of an automated system (MD 69-70). During the interview, Donsimoni described the issue as follows:

> *I worked on Watch Dogs Legion, that was written by mostly American writers and the game was set in London, so there was a lot of terminology that was supposed to be using British English, so we had a whole glossary of "this is how you say this", "this is how you say that", you say "apartment", you don't say "flat" or the other way around, you say "lorry" you don't say "truck", all these kind of things. Because it's still a human process, because it's essentially at this point just a list that you have to remember to check, people make mistakes.* (MD 71-77)

When creating the source language glossary, the style guide is used as a basis for deciding what to include in terms of, for example, regional dialects or language variations that are to be used in the game. This is expanded by going through the game text proper and identifying key terms such as game-specific terms referring to a gameplay mechanism (MD 306-311).

The writing and localization team collaborating on the creation of a glossary was not mentioned during the interview. However, the glossary created by the writing team is shared with translators to help them grasp the language and style used in the game, as well as inform them about terms that were chosen in order to avoid copyright infringement, terms that need to be kept in English, and similar information (MD 97-102). The glossary is perceived as part of an "entry point" localizers are given into the game. After that, there are checks on quality during the localization process, but there are no mandates given out by Ubisoft on how translation vendors should work on a given project (MD 91-93). This is partly caused by the fact that, due to working with translation vendors located in the respective target countries (MD 83), there can be no singular workflow-solution dictated by the development studio that would work well for all teams in every country. The development studio's role is therefore perceived as providing the translation vendors with all assets they need in order to be able to do their job, but to leave the specifics of how the work is done to the vendors (MD 93-95). The monolingual glossary given out to vendors is also seen as a way of conveying which terms in a game are important to the company and therefore should be given extra care, rather than a way "to force something specific" on the translators (MD 305-314).

While the individual translation teams can use the glossary they receive as a basis to start working on a glossary for their respective target language, this is not a service required by Ubisoft (MD 103-104). The reason given for why glossaries are not created on a mandatory basis is the awareness that, once created, such target language glossaries would need to be maintained in order to ensure their usability over an extended period of time:

> *It's not a requirement from us, because from what we noticed, maintaining a glossary is actually a full-time job. When we're talking about big games, we can reach a million words in the source language. Maintaining a glossary on that then means you do add up your translations, you do the next one, someone in the middle forgets to update one term, then your glossary starts to be unreliable. And a glossary that is not 100% reliable, we find it hard to work with, basically.* (MD 103-108)

In the end, while some individual project managers might ask for a glossary to better understand what their translation teams worked on, there is a general trust that the language vendors will

know best how to work with their teams for their language and the decision whether to create a glossary or not is up to them (MD 108-111). Requests from the marketing team for keeping certain terms in English or information about terms inherited from different games can also be included in the glossary. In such cases, not only giving out an instruction to translate a term a certain way but also explaining the reasons behind the decision is the preferred approach. Moreover, in cases like terms inherited from previous games, adding them to the glossary might not always be necessary, because their translation will already be stored in the translation memory (MD 317-325). Generally, translation memories are used as a "middle ground" to be able to communicate terminological needs without having to pull resources away from a project and put them into maintaining a termbase (MD 171-173). During the localization process of a game, key terms, such as locations or other terms that are referenced in the dialogue a lot, are likely going to end up at single word strings in a localization batch for maps or menu items, leading to the creation of a translation memory entry consisting of just the term. Over time, memoQ will come to "understand" that a certain term is to be translated a certain way and will make suggestions accordingly, helping the localization team in keeping terminology consistent (MD 125-129).

Depending on where in a game a term is used, translating it consistently with other instances of the same term being used can be more or less important. As Donsimoni explained in the interview:

> *[At Ubisoft,] we actually enjoy the fact that in dialogues our translators keep some freedom into changing the terminology – when it makes sense. If you're giving a direct instruction to the player, it should probably use something very similar to the menu item. "Grab that object", maybe object should always be translated the same. But when you have two NPCs talking about someone that was grabbing that object, maybe they use a different term and it's actually fine because it's how humans speak, they use different terms, different ways of expressing the same thing. So it's an in-between because we have a part that is very creative in the game. And a part that is extremely tight in terms of terminology, that's the first-party terminologies or Ubisoft guidelines on how we use our own, say, menu items, for instance.* (MD 150-159)

First-party terminology was stated to be "the part where maintaining a proper termbase would probably be a lot better" (MD 170-171), since failure to comply with mandates given out by Microsoft, for example, can prevent a game from launching on a system developed by that company. Nintendo also appears to strictly enforce rules regarding platform-specific

terminology, even enforcing it when different translations might fit better into the overall context of a game (MD 163-171). Moreover, companies with a focus that leans more towards game development, such as Ubisoft, also have their own guidelines covering the translation of, for example, menu items with the aim "to have all the menu items in all the Ubisoft games sound, look and read the same across all languages" (MD 158-160).

Since consistent translations of, for example, game titles or the titles of downloadable content sold separately from the game also need to be consistent among the in-game and marketing uses of these terms to maintain a good image of the company an in order not to impact the "overall feeling of quality" of a game, language resources created by the localization team are also shared with the marketing team. This ensures consistency in the wording and naming of parts of the game across all departments (MD 285-296). By making sure all teams use resources pulled from the same sources and encouraging the marketing team to use the same translation teams that also worked on the localization of in-game content, this aim can be achieved (MD 296-299).

Moreover, several instances of quality checking and assurance are performed on localized games. First of all, translators can access their translation memories during the translation process to compare their translation to what was translated for a project before. After a translator has finished their work, the translation is checked by a reviewer manually and automatically using the memoQ QA-checks. After that, localization testing is performed. These checks combined are sufficient to find and correct most of the issues in a localized game (MD 246-248). In the end, determining when the quality of a localization is sufficient is a matter of finding a balance between the intended level of quality, the importance of each issue that might still remain in the game script after a certain amount of testing, and the return cost of localization and its return of investment (MD 249-251, 261). Ultimately, games might still be sent out for submission with some issues in them (MD 248), but even if the company fails "a couple of submissions here and there", such issues can usually be resolved by implementing feedback received from the publishing company (MD 173-175).

During the interview, it was pointed out that using the translation memory to manage terminology is not optimal. However, using the translation memory as a tool for enforcing the most important terms in menus and similar locations within the game while allowing for some leniency in dialogues with NPCs, players still end up understanding what they need to do (MD 130-134). This distinction is made between dialogues and menu items because

> *if you're given a mission for instance by an NPC, the NPC is gonna say something, if it doesn't re-use 100% the terms that are used in the menus, it could be fine because the players still understand that's someone talking, maybe they have their own jargon, they speak a bit differently because they have an accent, they don't know what they're talking about when they give them the instruction then you have the menu, the guide that tells you "your current mission is grabbing this object from that place" and this is the part where it actually really needs to be really properly checked with the QA-checks in memoQ* (MD 135-141).

Ensuring terminological consistency in places like menus and quest descriptions is also a focus during in-game testing. Compared to translators, testers have the advantage that they see the game texts in their actual context and can therefore make judgements about for example whether a string mentioning an object is referring to a general class of objects or one object in particular, and can make adjustments when necessary (MD 145-150).

Since translation memories are the main language resource used in the video game localization process, it is important for project managers on the development side to carefully consider which translation memories to send out for a certain project, so that translators only get the translation data that they need (MD 332-333). Sending out too many translation memories can not only negatively impact the performance of the CAT-tool a translator is working with, but may also overwhelm translators by presenting them many matches with various translations because translations used in a series of games in the past might not be in use anymore. This is especially important when working with long running series, which in case of Ubisoft, might, for example, mean carefully considering which translation memories to share with translators working on a new entry of the *Assassin's Creed* series to avoid confusing translators with translation memory entries from older titles in the series that might have been released 20 years ago (MD 342-349).

After a localization project has concluded, translation memories are kept in-house at Ubisoft because, even though the company tries to work with the same vendors consistently to profit from working with translators who are already familiar with a game or franchise, this is not always an option (MD 270-273). While the company hasn't been using memoQ for a very long time (MD 377-379), during the interview it was apparent that there is a high degree of awareness of the value of translation memories as a resource for translation:

> *[We] try to keep as many as we can. We probably have some very old Assassin's Creed translation memory that we actually built back, because back in the days we didn't use*

> *memoQ for instance. Our vendors might, but we were sending out excel files and we were getting back excel files and then the rest was a mystery for us. We changed that, because it has a lot of value for us to use memoQ directly, especially because we get the translation memory and we can spread this translation memory across projects, of course. If we're doing a game that pools characters from different games, we're actually working on games like this, you have characters from Assassin's Creed and then from Watch Dogs and Far Cry, and we can pool all the translation memories from these games, maybe give them a penalty so that we make sure that the newer translations are given more priority than the older ones, but we can do that.* (MD 275-285)

Making sure the translation memories are "clean", meaning ensuring they don't include any translations or terms that have been rejected or rewritten, is also an important aspect of maintaining translation memories. During the localization process of a video game, a lot of content is rewritten and changed, so the translation memories have to be "cleaned up" and such rejected translations need to be removed in order to ensure the resource remains usable (MD 358-363). One practice Ubisoft is currently in the process of enforcing is to rebuild the translation memory after the localization of a game is finished (MD 368-370):

> *That way we get rid of all the iteration in between because we still have access to that if we want to, but we don't keep it in our database. If we re-align everything that is currently in our system when we ship the game, we know we have an accurate version of what is actually used in the game. We don't know that 10 years afterwards, if you have the first iterations, then you look, they're all coming from the same TM, one was translated in June the other one in July, a bit close and for a translator that might be confusing if you see two different translations for the same term, it's just because they were iterations. So, getting rid of these iterations helps a lot in the long run. It's a new process for us because we haven't been using memoQ for that long, but that also means that all our old games, because we rebuild the TMs from scratch from the game data, they're all clean-ish. As much as hundred thousands of translation pairs can be clean.* (MD 370-380)

Regarding questions that come up during the localization process within individual translation teams, having a setup where translators send their questions to their project manager, who sends them to the client company, receives an answer, and sends it back to their translation

team, was described as common (MD 184-186). However, using a setup with many layers was described as disadvantageous, because getting the answers to the translators who ask the questions can take a long time and some questions might get lost along the way completely if someone forgets to forward the information (MD 186-190). Another problem that can arise concerns making the answers to queries available to all translation teams to avoid having to answer the same question multiple times. With translation teams located all over the world, this system can become convoluted quickly, so at Ubisoft an online system was implemented to manage queries from the translation team (MD 192-195). As described during the interview, this system is

> *linked directly to our database so they just enter the ID of the string, it pulls all the context information, they can enter the question and then we receive the question on our end and then developers and the PM can decide "I know the answer to that question, I can give the answer", or I can forward it directly to a game designer or transcript-writer who knows exactly what it's about and they can answer directly in the tool and the translator who asked the question obviously sees the answer, can ask follow up questions and can have a sort of chat-discussion that we can monitor so they can exchange like "Oh, are you sure because you used that term in a different manner in some other places." "Oh yeah, thanks for noticing that." Our translators actually help a lot because they are very rigorous in terminology, more than the English team and we help them fix a lot of issues in English. But, also very important, if the French translator asks a question, the Italian translator also sees the question, so it's a continuous stream of information.* (MD 195-206)

The tool described in this example is called Loc Q&A as in "Loc Question and Answer" (MD 219). It has access to the content management system used at Ubisoft to manage all assets related to a game and removes the need to forward lists of queries from the translators to the client and back to the translators. Translators also appear to play a role in monitoring the source language use of terminology, notifying the English team of puzzling uses of terminology in the game texts. Giving translators enough time to ask questions using this tool is not always possible during the localization process, as sometimes short turnaround times don't leave room for even this short pipeline. Using the chat-feature integrated into memoQ, which would allow for even quicker communication between an individual translator and the writing team, is not feasible since neither are freelance translators obliged to work using this specific tool nor does the writing team use it (MD 207-214).

Generally, the writing and localization team don't use the same tools, so Loc Q&A is used as a "middle ground where all the information is available in something that is understandable for everyone" (MD 214-216). This setup is described as an improvement over the system for forwarding queries back and forth, because if a question has to go through too many people before it reaches its destination,

> *at some point someone in the middle is going to assume the answer and say "Oh, I don't wanna bother the client for that" and that's an attitude that I think is not helpful in the long term, because if we're not there to help the translators, how can they deliver good quality to us? So, we try to make ourselves as much available as possible.* (MD 229-234)

Having this kind of almost direct access to the writing team can also help the translators themselves to feel more integrated into the process, encouraging them to ask questions and emboldening them to also follow up on their questions if they feel an initial answer does still not provide enough information for them to produce an adequate translation (MD 235-239).

7. Discussion

The findings described in chapter 6 show that terminology management strategies found in video game localization differ from the practices described by terminologists as laid out in chapter 4. While there does appear to be an effort to create glossaries during the writing process, a practice described both by Donsimoni (MD 45-47) and recommended both by localization specialists (Chandler and Deming 2012, 68) and professionals with a focus on source language writing (Feil 2020, 32), creating these glossaries and sharing them with the localization team does not appear to follow methods for systematic terminology work as described in chapter 4.

7.1 Strategies for the treatment of terminology

The creation of monolingual glossaries in the context of the video game development process appears to be a common practice in the industry. Creating such glossaries is recommended by localization specialists such as Chandler and Deming (2012), as well as by Feil (2020), whose focus is on strategies for source language writers. Donsimoni described, however, that these glossaries are not extensively used by the writing team (MD 46-50). Similarly, while Feil (2020) recommends that writers should create glossaries or other lists of game-related terms and information, no recommendations are made for tools that might be used to facilitate or automate the creation or use of these materials.

Likewise, the practice of sharing monolingual glossaries is both recommended by Chandler and Deming (2012) and described by Donsimoni (MD 97-102) as a common way to give the localization teams working on a game an overview of important terms within the game. Kim (2019) also mentions receiving reference material prior to working on the localization of *Aion*. However, no coordinated effort to use existing monolingual glossaries as a basis for adding additional languages during the localization process was described and the way and extent to which individual localization teams use the glossaries they receive seems to be up to the individual teams.

Instead of using glossaries, based on reports by Kim (2019, 71) and Donsimoni (MD 113-115) in chapter 6, the main resource for managing and monitoring the use of terminology during a localization project appears to be the translation memory of the CAT-tool translators are working with. The use of a dedicated terminology tool or a terminology module within the CAT-tool used in a localization project was not described in any of the sources reviewed in chapter 6. However, the mention of translation memories that were built back from translations for older games, as well as a system of sending out translation memories that might be related

to a project with a penalty (MD 275-285) shows that the localization team at Ubisoft puts a great amount of thought into deciding which translation memories to use for a project. This focus on translation memories as the main linguistic resource used in the video game localization process can also be inferred from the services offered by XLOC (2023a) that were described in section 6.1. In the services offered by XLOC, a clear distinction is made between managing assets and managing terminology, with separate parties within the localization process being responsible for each of these tasks. Terminology management is implied as being part of the translation process and therefore not part of the process and asset management solutions offered by XLOC (see XLOC Globalization Solutions A Keywords Studio 2023a).

As explained in section 5.1 translation memories are databases that store source segments and their translations as translation units for reuse in new translations. As such, a translation memory could also be called a bilingual corpus of translations, which would make it a possible resource for term extraction (Heylen and De Hertog 2015, 204–5). That being said, recommendations for terminology work do not recommend using corpora of translated texts as sources for terminology work without consulting with experts in the respective field (COTSOES 2018, 65). This recommendation is already not taken as a strict rule in many translation-oriented settings, where translators use existing translations as sources for terminology (Bowker 2015, 311). In the case of video game localization, existing translations are an even more valuable source since, as described in detail in section 6.4, keeping translations consistent between in-game texts and marketing or across different entries in a series of game titles is an important measure of quality in a video game localization setting (MD 287-296). Moreover, using standardized sources to conduct terminology work related to video games as recommended by COTSOES (2018, 63) is not a feasible strategy for video game localization, where a portion of the terminology used in a game tends to be fictional (Kim 2019, 95), and the industry does not have well established terminological standards (Zhang 2014, 212). Instead, mandates made by individual publishers or hardware developers influence translation decisions for certain hardware or interface-related terms (MD 157-162). In such a setting, using translation memories as corpora of existing translations for a given game or game series as resources in terminology management can be seen as a valid strategy.

However, as described in section 5.1, the main purpose of translation memories and the function they are optimized to fulfill is that of reusing existing translation units (Reinke 2013, 34). Most CAT-tools offer translators the ability to perform concordance searches in their translation memory to look up words or phrases for which no match is retrieved automatically (memoQdocs n.d.), and this function is described by Kim (2019, 71) as the main method used

by translators to look up uses of terminology during a localization project. This turns looking up terminology into a manual task to be performed by the translator for many individual words and phrases, which could impact their efficiency, as it disrupts the translation workflow to perform manual research of certain words and phrases in the translation memory.

Donsimoni (MD 113-115) also described translation memories as the main tool used to enforce the use of specific terminology, but also explained that memoQ has the capacity to "understand" how certain terms that are translated frequently are translated, a feature which can help using consistent terminology in a localization project (MD 126-129). One way in which memoQ and similar CAT-tools could be able to suggest terminologically relevant matches without using the termbase feature is through subsegment matches described in section 5.1. Especially the yellow-coded LSC matches might be suited for monitoring one's use of terminology without using the termbase feature, which can be illustrated by the example provided in Figure 6.

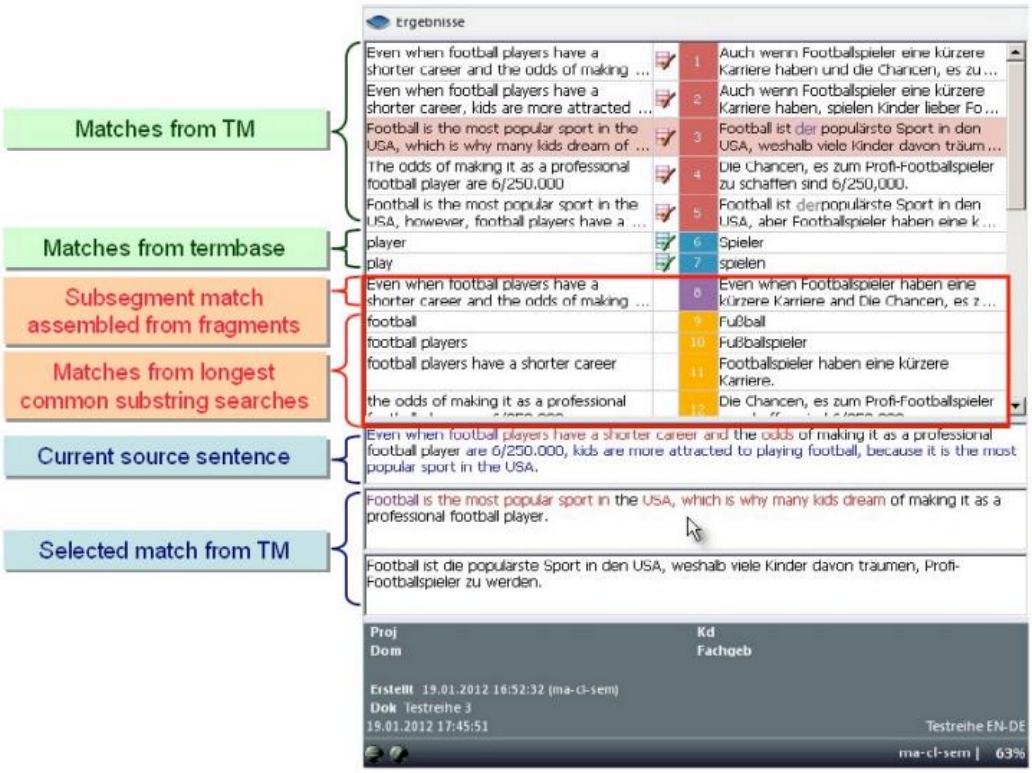


Figure 6: Subsegment Matches for a segment in memoQ (Reinke 2013, 34)

The source sentence used in Figure 6 reads:

> *Even when football players have a shorter career and the odds of making it as a professional football player are 6/250,000, kids are more attracted to playing football, because it is the most popular sport in the USA.*

LSC-matches for this segment include both the word “football” and “football player”, for which the German translations “Fußball” and “Fußballspieler” are suggested respectively, indicating that the translation memory used for creating this example included these translations which were retrieved as subsegment matches for the longer source string. Using a localization setup as described by Donsimoni or Kim (2019), one could expect to find similar LSC-matches for the key terms translated as single-word strings during the translation process or generally for terms that come up, and therefore get translated, repeatedly in a game’s script. LSC-matches would then help translators by providing relevant matches similar to the termbase feature but without the need to manually create and maintain a termbase, an effort described by Donsimoni as one of the main drawbacks of conducting terminology work related to video game localization projects (MD 104-108).

Figure 6 also shows a potential drawback of this approach, however, as the translation of “football” as “Fußball” is likely not appropriate for the source sentence provided, since it mentions football as “the most popular sport in the USA”. It would therefore stand to reason that the sentence is talking about American Football, which would remain “Football” in German rather than becoming “Fußball”, which would be “soccer” in American English. Indeed, the third LSC-match provided in Figure *6* shows “Footballspieler haben eine kürzere Karriere.” as a match for “football players have a shorter career”. While in this example, a translator using the subsegment matches provided by memoQ to search for a translation for the term “football player” would likely be able to pick the more appropriate “Footballspieler” based on the context provided by the source sentence, this example shows that terminology in a translation project might become muddled quickly if an inconsistent translation is entered into the translation memory, leading to unhelpful or confusing LSC-matches.

Translation inconsistencies are described by both Kim (2019, 78–79) and Donsimoni (MD 166-171) as a source of problems during the localization process, and can persist in published versions of a game, as illustrated by the examples of *Persona 5 Royal* and *The Legend of Zelda: Tears of the Kingdom*. Kim (2019, 78) links the occurrence of inconsistencies to translators not checking the correct use of a term against the translation memory and provides examples of inconsistencies found during the localization of *Aion*. The examples provided by Kim (2019, 78–79) illustrate that “plain” mistakes where a translator uses a wrong word to translate a term, as was the case with the “Merchants” who were mistranslated as “Miners”, can lead to variations in the translation of a term. The more common source of variations, however, appears to be caused by translators using synonymous words in their target language, as is the case with “Händler” and “Kaufleute” as translations for “Merchant” or, in cases where names

are transcribed from languages using different writing systems into roman writing, using different spelling variations such as “Upitinea” instead of “Jupinetia”. Inconsistencies also seem to occur in instances where a translator is not certain if a given term should be left in English, which Kim (2019, 79) states as a possible reason for the occurrence of the English name variation “Oriata” in the German version of the game. A similar case seems to have occurred with the item “The Craft of Cinema” in *Persona 5 Royal*. Moreover, even seemingly “uncreative” terms, such as the way a character is addressed, can lead to inconsistent translations, as was illustrated by the example of “Miss Ye” provided by Zhang (2014, 203) or can be seen by the variations of the phrase “grant a homing quality to the arrow” in *The Legend of Zelda: Tears of the Kingdom*.

Finding and fixing such inconsistencies during a localization project creates additional work, and their presence can cause ripple effects throughout the project, as inconsistent translations make both concordance searches and LSC-matches less reliable as means to solve terminological issues. Translators also don’t have the option of comparing different sources and solving a terminological issue by relying on the most credible one as suggested by Reynolds (2015, 281–82) as a way to solve terminological issues, since the translation memory is their main source of reference and other material given to them to gain an overview of a project before it started are unlikely to contain helpful information about the translation of specific terms that come up later in the game. This holds true even if, as explained by Donsimoni (MD 97-102), a glossary of terms that need to be kept in English or additional instructions for the translation of certain terms might be included in such material.

Another practice that was described frequently was the option for translators to raise a query about the translation of a specific term. Establishing an effective line of communication is highlighted by Chandler and Deming (2012) as an important aspect of a localization project. Donsimoni similarly highlighted that translators are encouraged to ask as many questions as they need during localization projects carried out by Ubisoft (MD 222-225), and having this option is described as very helpful by translators working on video game localization projects (Dealessandri 2020).

7.2 Similarities to terminological projects

Using translation memories or other types of corpora as tools for terminology management rather than sources for term extraction is not mentioned in practices of terminology work described in chapters 4 and 5. Méndez González (2019) shows that, even though video games

and the video game industry might not be considered a specialized field in the same way as for example medicine would be (Kim 2019, 107), video games and the surrounding industry work with and cover a wide range of concepts and corresponding terms that would justify organizing them using terminology management. A similar case is made by Zhang (2014, 203–4) who argues that employing systematic terminology management in the field of video game localization could enhance work efficiency and improve translation quality. Yet, in the accounts given by Kim (2019), as well as during the interview with Donsimoni, no systematic setup or workflow to carry out terminology work in relationship to a video game localization project was described. Still, some similarities to the processes and work setups described in chapters 4 and 5 can be found in the context of video game localization.

First of all, creating monolingual glossaries as resources for the writing team and passing them along to the translation team as a means to familiarize translators with the project they are working on appears to be a common practice described by Donsimoni (MD 97-102) and Bernal-Merino (2015, 132), as well as by Feil (2020, 32), whose focus is more on source language writers. These glossaries are not described as covering more than a term and its definition (MD 46-47), disqualifying them from being considered as "typical" monolingual terminology resources which are described by Dobrina (2015, 183) as also covering information about, among other things, a term's status as preferred or otherwise as well as grammatical information and its relationships to other terms in the resource. Nevertheless, the glossaries are created as resources to promote more effective communication among writers and between the writing and localization team, a purpose which is commonly fulfilled by terminological resources (Dobrina 2015, 183). Still, the creation of these glossaries seems to bear more similarities with ad-hoc terminology work, where only the amount of information needed to solve a specific problem in a specific situation is researched (COTSOES 2018, 66).

Similarly, an organized effort to create a multilingual terminology resource that would correspond to a type 2 terminological project as described by Dobrina (2015, 183) is not described by Kim (2019) or Donsimoni. Similarly, the monolingual glossaries are not used as a starting point for adding additional languages, which would be the process described by Dobrina (2015, 184) as a type 4 terminological project commonly associated with the creation of resources aimed at translators or interpreters. Instead, the extent to which terminology management is performed in each target language of a video game localization project appears to be largely up to individual language vendors (MD 88-95) without a process to coordinate such efforts across languages. This can also be exemplified by the fact that Kim (2019, 53) describes being tasked with overseeing the correct translation of certain terms into German

within the localization of *Aion*, but does not mention being given instructions on how to document his decisions or on how to coordinate his efforts with other language translators or the game developer. Combined with the common use of translation memories and their lookup function as the main resource for solving terminological issues that was discussed previously, the terminology work carried out by translators working on a video game localization project similarly bears closest resemblance to ad-hoc terminology work as defined by COTSOES (2018, 66). The extent to which the results of this ad-hoc research in the translation memory is documented is also mostly left to individual vendors. While Kim (2019, 72) describes that "key terms that are used a lot" could be added to the termbase feature of the CAT-tool the localization team of *Aion* was working with, the examples of inconsistencies that occurred during the project (Kim 2019, 78) suggest that the names of in-game items or locations were not always considered as candidates to enter them into the termbase. Documenting the results of ad-hoc terminology work, and later expanding such results into proper termbase entries is described by COTSOES (2018, 66–67) as one way to identify term candidates and grow a termbase, however, so it could be argued that rudimentary forms of terminology work are used during a video game localization process.

It should also be noted that the nature of terminology work done in video game localization does not seem to stem from an ignorance of the principles or requirements of terminology work on the side of video game developers. On the contrary, Donsimoni described considerations of the cost of terminology work in terms of time and human resources required to carry it out as one of the reasons why more systematic approaches to terminology management were not implemented at Ubisoft (MD 171-180), and stated it as a possible area for optimization within the localization process, especially with terminology mandated by hardware developers in mind (MD 166-170). Similarly, an awareness of the shortcomings of the current setup centered on using translation memories to monitor the use of terminology was expressed by Kim (2019, 78–79) who identifies it as a source of inconsistencies that need to be found and fixed in later stages of the localization project.

Moreover, as stated above, a system exists to enable translators to communicate with the video game development team and the writing team is available to answer terminological queries (MD 219-223). A similar setup is recommended by Chandler and Deming (2012, 116) and Berger (2020, 157) points out the importance of the writing and translation team cooperating, and advises source language writers to consult with the localization team to avoid issues later down the line. Kim (2019, 73–74) describes Q&A lists being compiled by translators and forwarded to the project manager who in turn forwards them to the client and, after

receiving the answer, sends this back to the project manager, reversing the pipeline. Donsimoni (MD 189-191) on the other hand describes an effort to make communication between translators and the writing team as direct as possible to avoid losing information along the pipeline. This is achieved by using a dedicated platform for translators to ask questions and writers to answer them (MD 219-223). This setup is reminiscent of what Dobrina (2015, 185) describes as type 7 terminological projects, which focus on answering terminological queries by performing ad-hoc terminology work when needed and do not aim at producing a terminological resource for later reuse. In the case of Ubisoft, this "query service" is set up in a way that allows translators working into different languages to see queries and answers posted by other translation teams as well as their own queries, and they can ask additional follow-up questions or discuss the use of terminology with writers, which also helps the writing team when translators point out issues in the source text (MD 192-206). The importance of communication between the writing and translation teams was also highlighted by Donsimoni (MD 225-229), who stated that, if the team at Ubisoft notices a lot of queries being raised on a specific issue, this can serve as an indicator that the localization team did not receive enough information to perform their task.

One very important aspect of managing queries is creating an environment in which translators feel they have the room to ask questions and don't need to worry about being reprimanded for asking too many. Loc Q&A was implemented by Ubisoft in an attempt to create such an environment, because problems with the localization can also be caused by translators not asking questions that come up during the translation process and instead assuming an answer (MD 222-224). Receiving a lot of questions from translators can be valuable feedback for the writing and development team as well as the localization team, who can use the amount of questions they received from translators as a means to judge whether the amount of context information given out to translators was adequate. Receiving large batches of questions can be an indicator that translators didn't receive enough information and it is considered part of the translator's job to notice such communication deficits and notify the localization team about them so more adequate information can be provided in the future (MD 226-229).

In addition to ensuring effective communication between the writing and localization team, the process of cleaning and archiving translation memories described by Donsimoni (MD 358-370) shows that there are already some systems in place to ensure the long-term usability of linguistic resources, as well as an awareness of the importance of such archiving and maintenance work. This process is perhaps even more crucial when considering the fact that, in

video game localization, translation memories are not only used in their "traditional" function as translation recycling technology, but also play a key role in terminology management.

This shows that a setup for terminology work with a focus on solving ad-hoc terminological issues exists and is used by both writers and translators working on a game. In combination with the monolingual glossaries already created during the writing process, implementing more systematic terminology management would not need to be an entirely new workflow but could be done by expanding upon existing resources and structures. One way to optimize the terminology workflow would be to expand upon the creation of glossaries and their implementation into the translation workflow in a more automated way by importing them into the termbase feature of a CAT-tool. A possible way to create glossaries with a heavier emphasis on the systematic collection of video game terminology is suggested by Zhang (2014, 208–9) and was described in section 6.1 in detail.

7.3 Expanding upon glossary creation

The previous section illustrated that there appears to be an awareness that translation memories are not ideal tools for terminology management. Donsimoni pointed out that there are issues with inconsistencies and that terminology management is an area in which the company sees room for optimization (MD 47-51). Terminology mandated by hardware publishers is a priority in this regard, since failure to comply with it can lead to games failing to get the approval for publication needed by the hardware developer (MD 95-97). This fact, as well as the aspect that terminological consistency appears to be more or less crucial in different parts of a game (MD 48-52), shows that, when creating glossaries with video game localization in mind, terminology could be categorized into different areas.

This approach is also proposed by Zhang (2014, 211–12), along with a way to classify video game terminology that is described in detail in section 6.1. Another classification of video game terminology is proposed by Méndez Gonzaléz (2019, 77–78) and described in chapter 1. Of these two classifications, the one proposed by Méndez Gonzaléz (2019, 77–78), which differentiates between terminology of the platform, game terminology and industry terminology seems to better align with areas of terminology in video games that can be inferred from issues described by Donsimoni and Kim (2019). In their respective reports, inconsistencies of in-game terms (Kim 2019, 78), failure to comply with mandates made by hardware manufacturers (MD 95-97), and inconsistencies between in-game and marketing translations (MD 289-296) were identified as terminology-related issues in the video game localization process. Terminology of

the platform would cover terms mandated by hardware manufacturers, game terminology could be used as a broad category for in-game terms, and industry terminology could encompass terms related to marketing texts. While Zhang (2014, 211–12) also suggests categories for technology-specific terms, his categories of genre specific terms could be included in the category of game terminology along with game-specific terms, the third category proposed by Zhang (2014, 211–12).

However, even with such broad categories for terminology in place, the issue of time and resources needed to create and maintain a terminology resource, one of the main reasons mentioned by Donsimoni for not focusing on terminology management at present (MD 175-180), remains. Indeed, implementing a sophisticated workflow for term extraction, evaluation and documentation like it was described in chapter 4 might not be feasible in the context of video game localization. As shown in chapter 5, on the other hand, terminology management implemented in translation settings does not always comply with all recommendations laid out by terminologists, and adaptations to meet the needs of specific settings, such as the ones described by Warburton (2015), are common. With this in mind, finding a way to implement some form of terminology management that is guided by terminological principles but also takes specific needs of the video game industry into consideration, such as the proposals made by Zhang (2014), could help in optimizing some aspects of the localization process.

Some steps of terminology management can also already be seen in video game localization practices, mainly the creation of monolingual glossaries to help the writing team (MD 45-47) and as a resource to be passed on to the translation team to help them familiarize themselves with the project (Bernal-Merino 2015, 132). These glossaries are described as not being complex, covering mainly "a definition and explanation of what the term means" (MD 47). This layout does not correspond with data categories called for, for example, by COTSOES (2018, 61), who specify that any provisory entry into a termbase should contain information about the term, the field it belongs to, it's allowed-status, reliability, sources, and administrative information. Nevertheless, they could be a valuable resource in implementing terminology management, and could be adapted into more automated forms of controlling the use of certain terms. One way to do this would be to import them into the termbase feature of a CAT-tool used in a localization process, which, staying on the example of memoQ, could be done using file formats most actors in the process would already be familiar with such as Microsoft Excel, which appears to be a common format used by developers to send out source text to translators (MD 277-279). While, as discussed in section 5.3, using such file formats to collect terminological data is less than ideal, as they tend to encourage the creation of glossaries that

don’t comply with terminological standards and tend to become unwieldy as they grow (Bononno 2000, 652–53), combining this method of collecting terminology with a more structured and automated termbase feature of a CAT-tool might be a useful gateway to introduce more structured methods of terminology management.

In order to ensure the glossaries are as reusable as possible, a layout similar to the one proposed by Zhang (2014, 208) could be used. This layout, which was discussed in section 6.1, contains some additional information to a term and its definition that is likely to be useful to translators. For example, grammatical information as well as context and in-game information are provided, giving a translator a better understanding of the meaning of a term and its correct grammatical use. In order to ensure the long-term usability of a terminological resource, COTSOES (2018, 58) points out that administrative information is one of the key factors contributing to this, since it makes the maintenance work required to ensure usability much easier if it is clear when an entry was last edited and by who. Taking into account data categories proposed by Schmitz (2015, 459–60), as well as recommendations made by COTSOES (2018, 37–57), the layout proposed by Zhang (2014, 208) could be expanded to include information such as the source string a term was found in, its approved status in regards to whether it was approved by the client or whether it is a term the translation team agreed to use, the person who added it to the glossary, and the area of terminology it belongs to. Figure 7 provides an example of a possible layout for a video game glossary, that was created using Microsoft Excel in order to be able to import it into a CAT-tool more easily. The same example of Miss Ye that was used by Zhang (2014, 208) is also adapted in Figure 7. Since no actual information about the game this character comes from is available, information such as the string ID were made up for this example.

A	B	C	D	E	F	G	H
String ID	**Term location**	**Chinese**	**Definition**	**Part of speech**	**Gender**	**Number**	**Context**
Example_ID_1234	in-game text	叶姑娘	Miss Ye is an elegant upper class lady. Be aware of the register and style when translating her dialogues.	character name	n/a	n/a	She appears in the task "Noble League".

I	J	K	L	M	N	O	P	Q	R	S
In-game information	**Game**	**Version**	**Domain**	**Comment**	**English**	**Context English**	**Source English**	**Last modified**	**Last modified by**	**Approved status**
Full name: Ye Haitang	jx online	3	In-game term		Miss Ye	n/a	n/a	xx.yy.zzzz	Christina	approved

Figure 7: Layout for a multilingual video game glossary (adapted from Zhang 2014, 208)

In Figure 7, the data category “grammatical information” suggested by Zhang (2014, 208) was split into three categories, “Part of speech”, “Gender” and “Number”, to reflect the grammatical information that can be displayed in a memoQ termbase (memoQdocs n.d.). This way, information will be displayed consistently in both the file used to collect terms and the termbase

in memoQ. If a different CAT-tool or layout is used in a localization project, the data categories should be changed to reflect the layout the terminology is meant to be imported into as closely as possible to avoid confusion and additional work. Moreover, the names of the categories "Source text" and "Target text" (Zhang 2014, 208) were changed to the respective languages, in this example "Chinese" and "English". If more languages were added to the termbase, a new category for each language could be created without risking a translator not being sure in which category their respective language should be added. The definition provided by Zhang (2014, 208), which simply states that the term is a "character name" was entered into the category "part of speech", since "character name" provides more information about the use of the term than its actual meaning. Instead, the information about the character provided by Zhang (2014, 208) in the "Comments" category was added in the category "Definition", since it more accurately describes the character and provides information about her that might be useful to a translator or writer by reminding them to use an appropriate register of speech for Miss Ye.

The category "Definition" was only added once, even though, according to Drewer and Schmitz (2017, 21), definitions should be given for each language covered by a termbase, since comparing definitions in different languages is the basis for establishing equivalence between terms in different languages. This layout is suggested because, as stated previously, a large portion of the terms found in a game tend to be fictional (Kim 2019, 95), meaning that the concepts they represent are unlikely to exist already in the target language and finding appropriate names for the new concepts is a priority in a fictional setting. When providing a definition for a fictional in-game term, information provided in-game such as the description of an item provided in a compendium similar to the one shown in Figure *5* could be used, if it is available. The layout might, however, not work as well in a setting more heavily inspired by real word events, but even in such games, the concept represented by a term is prescribed by what is depicted in the game and finding a term that represents the source concept as closely as possible can be seen as a priority in such a translation setting. Still, the Category "Source English" was added and should be added for each additional language to provide a means of communicating whether a translation was a new one created for a game, was pulled from an existing game, another medium related to a game series, or a different source used to translate a term with an existing real-world reference object. Similarly, a context category should be added for each language. Similar to the definition, for most terms, an additional context for each target language might not be necessary. This category should be used in a way similar to what was proposed by Zhang (2014, 209) as a means to manage variations in the translation of a term that relate to different contexts if such variations are necessary. For terms which should

be translated differently in different contexts, additional source language columns could be added and numbered similar to the example provided by Zhang (2014, 209) with the "Target text" category. By managing term variations, the ability to have different characters refer to items or places in a different manner that was highlighted by Donsimoni as a feature for writing natural sounding dialogue (MD 134-139) could be preserved even when managing terminology.

The categories "Last modified", "Last modified by" and "Approved status" were added to provide administrative data, allowing insights into when a term was last edited and whether it was approved by the client already. Moreover, the categories "String ID" and "Term location", which were created as data categories specifically for software localization in the context of project Dandelion (Schmitz 2015, 459–61), were included to provide information about which batch of source text a term was first found in and where in a game the term is going to be used. For the purpose of video game localization, the category "Term location" should not only specify where in the user interface or menu a term might appear, but also differentiate between "In-game terms" and terms that appear in the context of the user interface or are related to hardware.

Regarding the terms to be managed in the context of a video game localization project, the inconsistencies described in previous chapters suggest that names of in-game characters, items, and places are obvious candidates. These types of terms also partly correspond with the types of neologisms often found in the in-game text of video games described by Méndez-González (2019, 81–82), who, in addition to items, found species, weapons, and skills as areas in a video game where neologisms play an important role. Moreover, terminology mandated by hardware manufacturers or software developers would need to be included (MD 95-97), although Zhang (2014, 211) suggests creating separate glossaries for different areas of terminology depending on the scale of the localization project. In addition to such terms, the example of an inconsistency found in *The Legend of Zelda: Tears of the Kingdom* suggests that longer phrases used, for example, in item descriptions could be added to a terminology resource to help keep the wording consistent and avoid confusion about the effects of specific items. According to criteria for termhood in commercial environments proposed by Warburton (2015), such phrases could be considered as term candidates if they occur often during the writing process or are used in highly visible places within the game or marketing associated with it. Findings made by Rodrigues Rebechi et al. (2022) also suggest that, even in more creatively oriented translation settings such as restaurant reviews, translators can benefit from having a glossary of commonly used phrases available to them, as it helps them adapt their style to the

conventions of a genre, thereby enabling them to produce translations that are perceived as more fitting by their target audience.

Another issue that would need to be addressed when attempting to implement a more sophisticated approach to terminology management in the context of video game localization is the issue of time and resources required to fill in and maintain the termbase. This additional need for resources was stated by Donsimoni as one of the main reasons why terminology management is not implemented on a wider scale (MD 175-180). One way to reduce the amount of manual work required to fill a termbase would be to use automatic term extraction, which can serve as a way to quickly extract terms from a corpus of texts (Heylen and De Hertog 2015, 203). This could be done with scripts of previously translated games for which, as described by Donsimoni (MD 376-380), well maintained translation memories exist. While a human terminologist would still need to appraise the automatically extracted terms and some less frequent terms might get overlooked by this approach (Warburton 2015, 368), it would nevertheless greatly reduce the time needed to analyze large amounts of text, and could be a feasible way to extract terminology from older games in a series. Another approach to solving this issue could come from applying strategies of crowdsourcing to terminology management in a manner similar to what was described by Karsch (2015). Seeing the team of translators as the "crowd" in a translation project, they could cooperatively fill out a glossary in a shared file format that could then be imported into the termbase of a CAT-tool. While a senior translator, project manager or, as suggested by Zhang (2014, 205), a terminologist would still be needed to oversee the import of the termbase and support translation decision making in unclear cases, the additional workload for each person involved in the process could be kept smaller by using such strategies. Moreover, the entire translation team could be involved in finding translations for new terms, an approach also suggested by Honeywood (cf. Chandler and Deming 2012, 115) that would hopefully also help in avoiding confusion about whether a term found in a translation batch is new or whether a translation for it already exists.

8. Conclusion

Although the strategies of terminology management found in video game localization are more different from recommendations given by terminologists or strategies found in other fields of translation than initially assumed, an analysis of these strategies shows that video game developers and localizers try to find a way to balance achieving terminological consistency with the need to keep the workload demanded of all parties involved in the process at a manageable level.

Regarding RQ1, my research found that, while monolingual glossaries are created and used by the writing team, they are not a primary method for managing terminology. Instead, the main resources used to manage terminology in the game localization process are translation memories which are sent out to vendors. Translators are expected to use these translation memories within CAT-Tools and perform lookups within them on how terms have been translated in the past. While this approach can lead to inconsistencies in the translation, these inconsistencies are found and corrected during review steps of the translation workflow. Moreover, they are mitigated to some extent by the fact that the required level of terminological consistency can vary depending on the location of a given string of text within the game. While terminology mandates made by hardware developers or software developers might need to be enforced quite strictly, there is some room for leniency in other areas such as in-game dialogues.

RQ2 could simply be answered by stating that terminology management practices in game localization bear only little resemblance to the principles of terminology work laid out in chapter 4. While some glossaries are created to help the source-writing team and are also shared with translators, these do not appear to have the characteristics or include the data categories typically called for in systematic terminology work and bear the closest resemblance to ad-hoc terminology work. There is no indication of a coordinated effort to extract or structure terminology from a specific game or franchise. There is, however, a system in place to allow communication between the writing team and localization teams, with high emphasis on answering questions that arise during the localization process. Such questions are made available to members of all translation teams for each target language of a project and efforts are made to encourage translators to ask about any issues they encounter.

Moreover, there is a high degree of awareness of the importance of translating certain terms within a game consistently, as well as the need to translate certain terms a certain way to comply with mandates made by hardware developers or company-efforts to enforce a consistent way of wording certain elements of the user interface. Terminology resources are also shared between writing and marketing teams in the source language, and marketing teams are

encouraged to use the same localization teams who also worked on in-game materials to ensure consistency between in-game and marketing texts.

The main reason why more systematic terminology management is not implemented is stated to be the cost of doing so, both in terms of creating and maintaining the resulting resource. Terminology management is still seen as a possible area for optimization within the video game localization process. This could be achieved by building upon methods already in use, such as working towards a more systematic approach to the creation of game related glossaries, and their expansion to include more languages.

This research is limited by the small number of direct insights available into the process of managing terminology in the context of video game localization. Moreover, all records analyzed here were focused on localization projects where the translation was outsourced to external vendors, leaving open the question of whether video game developers who localize their own games in-house use different approaches to terminology management. Further research into this field is therefore needed to gather a more representative overview of terminology management best practices in the entire industry. Another factor that has not been considered is the actual need of translators and the extent to which they feel terminology management would help solve problems they face while translating or whether they would prefer other approaches to solving issues they face when translating video game texts. Applications of strategies of crowdsourcing or the viability of automated term extraction in video game localization also present areas in which further research could provide useful insights into ways to implement more systematic approaches to terminology management in video game localization.

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Appendix

Appendix 1: Transcript – Interview Mathieu Donsimoni

I = Interviewer

D = Mathieu Donsimoni

00:27 I: I'm just going to start with my first question. I think you already know my aim is to investigate terminology best practices in video game localization, but before I ask specifically about this, I would like to know more generally what your role in the localization process of a game is at Ubisoft.

00:47 D: Sure. I used to be a localization project manager until a couple of years ago. At Ubisoft we work with localization teams that are directly part of the game development production teams. So we are sitting with the voice designers, the game designers, and everyone else, which honestly helps a lot to better localize the game because we understand it better, we have better contact with the writing team, with the voice design team, everyone. We are a community and a group of people who regularly talk to each other, but we are all sitting in different areas of the world, because we have a lot of studios. Any country, you name it, we probably have a studio there. So contrary to some other companies where you would have localization as a service within the company, we really act as part of the production team, so it's a bit more pressure, but it also allows us to be much more involved and have more impact on localization in the end. Currently I am not doing that anymore. The problem with being completely decentralized is when you need to have centralized tools, processes, you don't really have anyone to do that so now that's what I'm doing. I'm working on tools, processes, helping other teams better achieve their goals, technology if I can via processes and globally acting as a reference for anything that is technological in Ubisoft, basically. And localization.

02:28 I: Okay, that sounds like if the localization staff is also part of the development staff they are involved in every part of the development, so they are always on the know.

02:40 D: Absolutely. We start when the project is often just an idea, like a quick demo, maybe some reference graphics, maybe no text in the game yet, so we can already start working with the team and explaining the needs. If we are going to localize the game in French it's much easier than if we're going to do Chinese and Arabic for instance, completely different problems, so the earlier we start the better, essentially.

03:09 I: And when you start working on a game and you start writing it in one language, I'm assuming English, do you already create some kind of glossary when you write the game in the original language, or do you use any other kind of authoring system or something like that?

03:31 D: Yeah, absolutely. We are a French company but most, if not all our games are written directly in English because it makes more sense when we have international presentations and things like this, it's much easier. We do have a few projects, mostly based in France, who would write the game directly in French, then have it translated to English as the main language, but English stays our main language. We do have an authoring system at Ubisoft, it's called Oasis, like the oasis, which is, very shortly, a database for all that is narration related, so you have your text, you have your audio files, you have your narrative structure and also your translations and audio recordings for localization. They all work within that same tool, that same universe so that when we look for the game content that we need to localize, it's all in one place, it's all in one structure, organized with all the metadata information that helps translating. If you just have one word, "open" for instance, is that a word, is that a noun, where does it belong in the game, we have all that information in one place, all centralized. There is some system for managing terminology on the English side. It's pretty light, it's not extensively in use, but it's mostly in the form of a very basic glossary with a definition and explanation of what the term means. It's probably too light, if you ask me, because from a localization point of view, we see that there are some mistakes being made in English, like a term that is used in one place is not exactly the same one in a different place, which makes for things that don't work well, if you're talking about an item in game it should be called the same thing all over the place. It's not the same with dialogues when you can have people talking differently about the same thing. An item, in general, is expected to be always the same. We are actually working on that, to improve that, and have more cross checks that would be automated, essentially linking a word within a sentence to it's glossary, ideally in a semi-automated way, so that when a writer writes something about something it automatically links with the glossary term so you can see that that belongs to that glossary. I think the main purpose would be to track changes. A problem we have, because our game development is very intuitive, we start with an idea, we try to see if it works, it doesn't, we change some things. If you have 100 strings in a game that mention an object, an item, a place, whatever, you need to make sure that all these stay consistent. It's actually very easy to forget one if they are not very strongly linked together. So, a search and replace can do the job, but there are exceptions. If we're talking about singular and plural for instance, if you search a word that has a slightly different declination in plural, that doesn't stay

100% the same, you're probably going to miss one. We're trying to work on that to improve that, but there's still a lot to be done. I think the writing team is not as sensitized as we are from a localization point of view in terms of respecting a glossary very strictly.

07:09 I: That's a little surprising, I would have thought that for the team writing the game it's also really important to make sure that they have their item names straight and things like that.

07:19 D: They do have that. They have style guides, they have a glossary, but because it's not in an automated system it's very easy for a human to make a mistake. That's the problem we have. Because you have a list of terms. I worked on Watch Dogs Legion, that was written by mostly American writers and the game was set in London, so there was a lot of terminology that was supposed to be using British English, so we had a whole glossary of "this is how you say this", "this is how you say that", you say "apartment", you don't say "flat" or the other way around, you say "lorry" you don't say "truck", all these kind of things. Because it's still a human process, because it's essentially at this point just a list that you have to remember to check, people make mistakes.

08:10 I: Coming back to these glossaries in a bit more detail. So far I've only asked about glossaries for one language but when you come to localization, how do you add more languages to these glossaries or do you even use the same glossaries the writing team used for the localization teams or do you create new one from scratch?

08:34 D: In the localization process we externalize most if not all of the translation and recording, so we go through vendors, mostly located in-country. We tried a long time ago to have internal translators, the problem is, I'm French, I live in Québec, my French is already starting to degrade, I start using lingua that is not from France, it doesn't work. And it's the same for all people that are immigrating, so we prefer to have translators in-country, it produces the best results for sure, you have the most accurate representation of the actual language that is currently spoken in a country. So, because we use external vendors, they often have their own way of managing terminology. It's part of the service we buy, it's the same thing for translation for recordings. We buy a service where they work the best to provide the assets that we require. We give them an entry point, which is a script and audio files if we're talking recordings and, in the middle, we still have a look at how they do things, but we don't necessarily influence 100% of how they work because if we're talking to a French translator or Japanese studio, they don't have the same ways of working. We can try to help them, try to provide them better assets, but in the end they also pick their own way of working. Regardless, terminology is still

something we need to manage, for instance we have our own Ubisoft-terminology but when we're working with Microsoft and Sony we also have to respect these terminologies. And we give them the glossary of the game which is often seen as essential in terms of simply understanding the style of language, the target that we have, there is a reason why we picked that word and not that one, maybe it's because there is a copyright on that term, or maybe it's because the author thought it sounded cool, maybe that term we want to keep in English because we want to make some sort of a brand inside the game. We give all this information to the translation teams so they can start working, if they want, on a glossary of the same. It's not a requirement from us, because from what we noticed, maintaining a glossary is actually a full-time job. When we're talking about big games, we can reach a million words in the source language. Maintaining a glossary on that then means you do add up your translations, you do the next one, someone in the middle forgets to update one term, then your glossary starts to be unreliable. And a glossary that is not 100% reliable, we find it hard to work with, basically. So we leave that to the vendors, we don't ask them for instance to deliver a glossary on a mandatory basis, some PMs might because they're interested in seeing that correspondence, but we let them work with whatever they feel is best for the language and their ways of working. That said, that doesn't mean that we don't try to help them, we use memoQ, I'm pretty sure you're familiar with memoQ, you're working in translation, so, we use memoQ which does have a QA-system. It helps us a lot enforcing terminology that matches terminology which has been previously translated. We don't necessarily use the termbase that is within it, because it's still a lot of manual work, our freelancers and translators are free to use it if they want, we don't require it from them, but just the QA-checks that we can run help us a lot in managing this. We know that it's gonna spot these inaccuracies much better than a human could do when we're talking a million words.

12:32 I: Yeah, for sure. But I'm a little confused because on the one hand you said you weren't really using the termbase integrated into memoQ, but you are still running automated QA to make sure that words are translated consistently. I'm not really sure I understand how that works because from my experience part of the automated QA in memoQ is actually checking words against the termbase in memoQ but if you're not really working with that –

12:59 D: There is a part that we're missing because obviously we are not using the termbase but, because our games, if you have a place, a location, something that is referenced in the dialogue, we're very likely to have a map or a menu system or something like this and you're gonna have a translation memory entry with just that single word and in the end memoQ

understands this as “hey, this is how you translate that word” so that helps us a lot. If we’re talking about 100% dialogues then no, it’s not optimal, I definitely agree with you, the optimal way of using this would be to create and maintain a proper termbase, for sure. So it’s not something we’re truly rigorous with because we benefit from that, because we have all the single word entries in the TM that help us maintain the most important ones and then when it comes to dialogues there is a bit more leniency in terms of how the players will describe. Often, if you’re given a mission for instance by an NPC, the NPC is gonna say something, if it doesn’t re-use 100% the terms that are used in the menus, it could be fine because the players still understand that’s someone talking, maybe they have their own jargon, they speak a bit differently because they have an accent, they don’t know what they’re talking about when they give them the instruction then you have the menu, the guide that tells you “your current mission is grabbing this object from that place” and this is the part where it actually really needs to be really properly checks with the QA-checks in memoQ.

14:39 I: I see, so you kind of decide on how rigorously you’re going to, I’m gonna say enforce, it’s probably not the right word, but how rigorously you enforce it based on the location of the word within the game.

14:50 D: Exactly. And then what helps us is that we always have a second pass of quality on our translations because we do in-game testing as well. The testers we hire see the game in context whereas all the translators have is a guide, they have workbooks with information about the game, but they don’t see the game proper when they’re translating. They have an idea of the scene and how it works so they understand that this term is talking about an object in particular or it’s just a general for this kind of object so they can make a different translation. We actually enjoy the fact that in dialogues our translators keep some freedom into changing the terminology – when it makes sense. If you’re giving a direct instruction to the player, it should probably use something very similar to the menu item. “Grab that object”, maybe object should always be translated the same. But when you have two NPCs talking about someone that was grabbing that object, maybe they use a different term and it’s actually fine because it’s how humans speak, they use different terms, different ways of expressing the same thing. So, it’s an in-between because we have a part that is very creative in the games. And a part that is extremely tight in terms of terminology, that’s the first-party terminologies or Ubisoft guidelines on how we use our own, say, menu items, for instance. We would like to have all the menu items in all the Ubisoft games sound, look and read the same across all languages, if you

start a new game, it should probably always be the same term, so we do have translation memories for this and that helps us keeping that consistent.

16:39 I: You said translation memories so assuming you give out this Ubisoft-specific terminology to vendors in some capacity, do you do this as a translation memory, or do you create glossaries in some other formats as well?

16:56 D: We use translation memories. Honestly, I would very much like for all the first party terminology that is extremely strict, you can be prevented from releasing a game if Microsoft finds terms they don't like, Nintendo is extremely harsh about this, like "this is one way you say this, you cannot say this word, you cannot even use it if it means something else in the context of the game, you're not even allowed to use that, so this is the part where maintaining a proper termbase would probably be a lot better. We don't put the resources to do that so we use translation memories as a middle ground because it still works well and we have people doing extra checks just to make sure and then we fail a couple of submissions here and there where Microsoft tells us "no, that's not how you're supposed to say this", we fix it and they're happy and we're happy and it's good. So it's finding that balance between having a full, because honestly, with the amount of games that we have and the quantity of terms that we would have, there probably would be a whole service dedicated to maintaining termbases across all languages that we have and historical data and everything and we found that we still achieve the quality that we want in terms of terminology and putting that much emphasis on this would pull resources from other, probably more valuable things for us at the moment.

18:21 I: I see. But when a question regarding the name of an item for example comes up in a localization team, is there some kind of pipeline set up for a translator working with a vendor to ask your development team about terminology-related questions?

18:40 D: Absolutely. One thing that we try to do is, often, if you would work as a translator for a different game development company you would have so many layers between development team and the end-translator. You have the production team that sends to someone as a service that aggregates all the production requests that sends to a PM at the company that sends to a PM at the vendor company that delegates to a lead translator and then you have the end-translator. If you need to backtrack all this, that's gonna take ages and some people aren't going to remember to aid it so we try to bring them as close as possible and remove as many layers as possible. We used to use excel-sheets where you write the name of the string, the English and then your question and then we're going back and forth. It was a problem because translators

are located all over the world and you really need to make sure that the Japanese question that was the same also would be accessible to the French translator and so on so now we have an online system where the translators can go. It's linked directly to our database so they just enter the ID of the string, it pulls all the context information, they can enter the question and then we receive the question on our end and then developers and the PM can decide "I know the answer to that question, I can give the answer", or I can forward it directly to a game designer or transcript-writer who knows exactly what it's about and they can answer directly in the tool and the translator who asked the question obviously sees the answer, can ask follow up questions and can have a sort of chat-discussion that we can monitor so they can exchange like "Oh, are you sure because you used that term in a different manner in some other places." "Oh yeah, thanks for noticing that." Our translators actually help a lot because they are very rigorous in terminology, more than the English team and we help them fix a lot of issues in English. But, also very important, if the French translator asks a question, the Italian translator also sees the question, so it's a continuous stream of information. We try to give them enough time to ask questions before delivery but sometimes we have an emergency so it's a two-day-turnaround, while they still have that instantaneous kind of feedback, sending e-mails, asking questions via a different tool that the writing team wouldn't have access to, we could use the chat in memoQ to ask questions, for instance, but what happens when a translator actually doesn't use memoQ, because they can not use memoQ and use a different tool if they want, they can extract the xliff and just use it in a different tool if that's what they're comfortable with. More importantly, our game designers and our script writers, they don't know anything about memoQ and they don't want to, and it's fair. We don't want to know much about their tools, they don't want to know about our tools. So we have that middle ground where all the information is available in something that is understandable for everyone.

21:41 I: So, you don't really have a set of tools that the writing team and the localization team are using together?

21:50 D: We do have a tool, it's a tool called LocQ&A for loc question and answer, very creative name, and it's a tool that we put in place just for that purpose and it's an online tool. The translators have access to it, they can write questions on the project, it notifies people when there are new questions, it notifies them back when it's been answered, so it's something to help and make them feel more inclined to ask questions. The problem that we often have is that translators feel like "Oh, I should be able to understand that" and we don't want them to assume, and we want them to feel free to ask as many questions as possible. If you have a batch of 100

questions, well ask them. Maybe there is a reason why you have 100 questions and more often than not it's because they don't have enough context, we didn't give them enough information or we thought that was enough but it's not enough for the translator and it's their job to notice that and tell us when they can. What we notice is that if we have a very formal process of submitting questions through a lot of intermediaries, at some point someone in the middle is going to assume the answer and say "Oh, I don't wanna bother the client for that" and that's an attitude that I think is not helpful in the long term, because if we're not there to help the translators, how can they deliver good quality to us? So, we try to make ourselves as much available as possible. I worked with different companies, I worked as a vendor and I think that this almost direct access to the writers themselves, it helps a lot. It helps so much because the translators feel more involved and they have direct answers to their questions, not something that has been filtered through so many layers that in the end they're like "Oh, I don't know if that really answers my question. Oh, too bad, I'm just gonna go with what I think it is." Which is bad, honestly.

23:48 I: Yeah, that sounds like it would lead to a lot of errors. Apart from the in-game testing that you do for the translated versions of the game, are there any other tests that you run or processes in place for you to ensure that the translations, especially the translations of item names or other terminology-related items are consistent throughout the game? You already mentioned that there was some flexibility regarding whether it was used in a dialogue or a menu item.

24:22 D: I think that with the layers that we have, so the translator has access to the TMs, most of them have a two-pass-system so you have a translator then a reviewer, then we have the memoQ-QA behind it, then we add localization testing, that covers most of the issues. We probably still ship games with some issues, it's then a matter of finding the balance between what level of quality we want to achieve and how important it is, it's always about finding that balance. If you would ask me, would I have an infinite budget, I would pay my translators double so that they can spend all the amount of time that they want to but at some point we also need to justify the cost that we spend on translation. Justifying the cost of localization is always a struggle in all companies, if you ask "Well, people speak English, they can understand the game just fine". But then we track the data and we show that our players, actually if they're from Germany, they play a lot in English even though if you go to Germany then the younger generation, they mostly speak English and understand English well. Well, we see in the data that they actually play in German, even if you go to online, like reddit or whatever, you see a

lot of people saying “Oh I don’t care about subtitles, translations are bad”. We can tell that these are the exceptions. The data that we can see from players who actually play in opposition. So it’s always finding that balance between the cost and the return in investment. Localization is very sensitive to the time that we give to the translators. But they’re also freelancers that need to be paid for the time that they spend, so it’s not because we give them two weeks for something that would take two days that they’re gonna spend the two weeks. They need to work to make a living, so it’s really finding that balance.

26:24 I: And once the localization of a game is finished you would have the new translation memories for all the different languages, do you have some kind of system in place to archive and update these translation memories to reuse on a sequel of the game or something like that or do they stay with the vendors?

26:45 D: Yeah, absolutely, we keep them. We do keep them because we don’t always work with the same vendors. We try to keep some stability, because we know that it helps and it’s also nice to work with the same people you already know, that already know the game and the franchise and everything, but we do keep them on our side. We keep most of them live, because we found that archiving means that someone has to take them back and might not think about taking them back so hard drive space is not that expensive nowadays so we try to keep as many as we can. We probably have some very old Assassin’s Creed translation memory that we actually built back, because back in the days we didn’t use memoQ for instance. Our vendors might, but we were sending out excel files and we were getting back excel files and then the rest was a mystery for us. We changed that, because it has a lot of value for us to use memoQ directly, especially because we get the translation memory and we can spread this translation memory across projects, of course. If we’re doing a game that pools characters from different games, we’re actually working on games like this, you have characters from Assassin’s Creed and then from Watch Dogs and Far Cry, and we can pool all the translation memories from these games, maybe give them a penalty so that we make sure that the newer translations are given more priority than the older ones, but we can do that. We also use that to share with, say, marketing teams for instance. Historically, the marketing team and the production and localization team were working very separately. They were asking us at some point for a glossary but maybe they already had started working on some terms, so we had some discrepancies. You had an in-game name and then the marketing leaflet was saying something different. That’s very bad, that’s probably one of the worst things. As much as in game we can have some discrepancies and it’s fine, when you’re trying to sell something to the player or communicate to the player for some

marketing purposes, it looks bad when you have something that's like the new DLC, no, it's not called that name, it's something else, wait, you're trying to sell me something but cannot even find the right name for it? That's not good. For the image of the company, the game and for the player it's a bad feeling. It doesn't impact the quality of the game and the gameplay but it's that overall feeling of quality. So, what we do is we made sure that now we're all pooling from the same source of data, they can see our translation memories, they are very much encouraged to use them. They are also encouraged to use the same translation teams if they can. That way we all work with the same information that is centralized and that everyone as access to.

29:38 I: Alright, thanks. Can I come back to, you already said you don't really have your vendors create glossaries but you also mentioned at several points that you do send out some kind of glossaries to your vendors to help them get started, can you explain in a bit more detail how these glossaries are made up, so for example what do you include in them? Is it just one word and then the translation or is there also some definition included?

30:07 D: It's mostly monolingual. It's the source-glossary that we create that we share with everyone. We would usually start with the style guide that has been created by the narrative team and go over the game and try to find and identify the terms that are key. If we're talking about a game set in London, as I was mentioning, we're gonna try to find all the very specific British terms that may be a bit different than what you see in other games, make sure that they are listed with a definition and explanation. We also try to spot all the game-specific lingo. If you have a gameplay mechanism, probably that gameplay mechanism should be in the glossary so that – it's not that we want the translators to force something specific, that's their job to find a translation, but we want them to know that this term is important to us, please pay attention to it. That's the essence of the message.

31:08 I: Okay and then all of your vendors are free to create their own glossaries for the translation or don't translate them as they see fit.

31:17 D: Exactly. We might have some directions from our local marketing team that are gonna reach out to us and say "so, this term, we wanna keep it in English", so we're gonna add that mention to "okay, please keep that term in English for that and that reason", if we have an explanation it's all the better for the people wo actually are going to work on the translation. Or that term, we know that it's coming from a different game, that's why we have it, and we can give that information. In that case we don't necessarily need to work on adding the existing translation, because they're already in the TM. But they need to understand that this term, it's

not a random word, it's a word that actually comes from a different game or a previous game or something like this.

32:00 I: Thanks a lot. I actually only have one question left and this is again more on the organizational side of things, do you have a person, or maybe you even are that person who is responsible for overseeing what's happening with all of the TMs, what is being send out to what vendor and what is coming back, to keep track of all of the language resources that are being created.

32:29 D: What we do is, we work with vendors, they all have NDAs, obviously because we need to make sure that the resources we share are secured enough. So, we are enforcing, for instance, access to the TMs should be restricted to what you actually need. It would be very human to say "I'm gonna give them as much as I can so that they have more visibility", but at some point it might be a game that they're not working on, that has not been announced yet. That happens. And it's a thing that we're trying to work and prevent, all our game content databases are all segregated, so you only have access to one piece of information at the same time, we cannot cross matches. memoQ works differently because there is a memoQ server, you have all the TMs, all our project managers are envied, actually on the platform because we want them to see other projects and work with data from other projects. It's a lot of training and sensibilization to people and explaining that "okay, don't include TMs just because they are there. There should be a reason. If you're pulling data. Giving too much information is sometimes overwhelming and actually has a negative effect. If you bring TMs, you're working on AC, we're bringing AC ten maybe now, I don't know, too many numbers, but if you're pulling data from AC two or three, there should be a good reason for doing that. You should not just be doing it by default because it's there. It hurts the performance of memoQ, and it also hurts the brains of the translators who are going to see so many matches for that string that are all variable, something like 20 years ago might be a translation that we might not want to use right now. If there is not a very definite purpose for that at least. If we're doing a remake of the game, obviously you want to pull that translation memory. If it's just for reference, then we try to limit and explain what information the translators would like to receive. It's actually a global problem, it's very tempting to actually give all the information that we have. We have these game design documents that are hundreds of pages long. I've been a vendor, I know what it is when you receive that, you're like "what am I supposed to do with that? It's 200 pages, a lot of that is just game systems that I don't need to know about." So, filtering that information is actually a lot of the work that we need to do internally so that information that is received is

really precise. If we're working on just Xbox and Sony and not Nintendo, let's not send a glossary for Nintendo. Cause that might be confusing. Or, same thing, keeping the TMs clean, so removing the terms that have been rejected, rewritten, we have a lot of processes that we translate something and then 50% of it is going to be changed when we ship the game. At some point during that cleanup and removing the things that have been rejected. Otherwise you have all these matches for terms that actually have changed since then, and it's pollution and it doesn't help in organizing all that.

36:00 I: When you say you are keeping the TMs clean, so deleting for example rejected terms, is that something you do in house at Ubisoft or do you also rely on your language vendors for that?

36:12 D: We don't ask them to manage the TMs. They manage their own TMs on their side, that's their responsibility. What we can do is, when we close the game, when it's finished, one good practice that we try to enforce, not there yet, but it's actually to rebuild the TM with the content that we kept in the database. That way we get rid of all the iteration in between because we still have access to that if we want to, but we don't keep it in our database. If we re-align everything that is currently in our system when we ship the game, we know we have an accurate version of what is actually used in the game. We don't know that 10 years afterwards, if you have the first iterations, then you look, they're all coming from the same TM, one was translated in June the other one in July, a bit close and for a translator that might be confusing if you see two different translations for the same term, it's just because they were iterations. So, getting rid of these iterations helps a lot in the long run. It's a new process for us because we haven't been using memoQ for that long, but that also means that all our old games, because we rebuild the TMs from scratch from the game data, they're all clean-ish. As much as hundred thousands of translation pairs can be clean.