JSSER
www.jsser.org

Journal of Social Studies Education Research
Sosyal Bilgiler Eğitimi Araştırmaları Dergisi

2019:10 (3),346-363

Reconfiguring Localization Quality Assessment for Video Games

Agung Prasetyo Wibowo[1], M.R Nababan[2], Riyadi Santosa[3] & Diah Kristina[4]

Abstract

Studies conducted on localization quality assessment (LQA) on video games from interdisciplinary perspectives, dominantly employ studies on media, demarcating it from their derivative concerns like environmental issues. We argue that LQA on video games requires reconstruction from eco-criticism perspectives, because electronic waste (E-waste) of video games has been a serious concern since the legalization of European Union 2003 on Waste Electrical and Electronic Equipment. Analysing the uplift in file size and extra power consumption exposed from purposively selected twenty game titles, this article proposes the possibilities to construct eco-criticism based LQA. Video game localization scholars and practitioners could benefit from the proposed LQA to appraise possible environmental issues emerging from the localization process.

Key words: *localization, video game translation, e-waste, video games*

Introduction

E-waste has been a serious concern in the video game industry. Moore (2009) emphasises that e-waste results from physical game items such as disc-based formats and paraphernalia items like guitar controllers from 'Guitar Heroes'. Besides physical e-waste, the video game industry also exposes potential e-waste on digital aspects in terms of file size (Mayers, Koomey, Hall, Bauer, France, and Webb, 2015), wherein localization process might play a significant role in file size growth.

Linguistics, cultural and legal problems revealed in the localization process might contribute to increasing file sizes. This localization-driven file size emerges due to the absence of what Chang (2013) terms as ecological localization, which concerns on linguistics and translation studies in localization as a misnomer. This ecology integrated localization practice further signifies the importance of constructing a localization quality assessment (LQA) with similar perspectives on the environment. In Arc System Works Blazblue: Calamity Trigger Portable for PlayStation

[1] *S.S., M.Hum., Sebelas Maret University, agungpwpw@gmail.com*
[2] *Prof., Drs.,M.Ed., PhD. amantaradja@yahoo.com*
[3] *Prof., Drs.,M.A., M.Ed., PhD., riyadisantosa1960@gmail.com*
[4] *Dra., M.A., PhD. kristina_diah@yahoo.com*

Portable (PSP), a porting version of Blazblue Calamity Trigger for arcade and console, for instance, suffers a data shift nearly doubling in size from the Japanese version, with 585 MB, to 862 MB in the North American version. Since PSP provides digital distribution, it implies that the downloading time for the US version is longer than that of the Japanese version. Because more downloading time indicates more energy consumption, the case of Blazblue localization pinpoints that environmental concerns are not yet considered. In ecological localization perspectives, the 277 MB gap revealed from the Japanese and North American versions ushers a deficient quality of localization.

Similar cases include multidisc games like Square's Final Fantasy VII and VIII for PlayStation, Media Vision and Contrail's Wild Arms 2nd Ignition and Square Enix's Final Fantasy XIII for Xbox 360. These games indicate that the possible presence of future disc and plastic waste is high. In relation to environmental concerns, the mentioned possibility of disc and plastic waste contributes in the piling of e-waste. Regarding video games, e-waste resulting from video games, based on European Union 2003 on Waste Electrical and Electronic Equipment (WEEE), is classified into toys, leisure and sport equipment and is furthermore, ranked seventh in the e-waste category (Wath, Dutt, Chakrabarti, 2011). This categorization strengthens the necessity for video game quality assessment including its localization to incorporate environmental and ecological perspectives.

Research Questions

1. How is Eco-LQA implemented to qualitatively analyse video game localization quality?
2. How is Eco-LQA combined with a metric to quantitatively analyse video game localization quality?

Literature Review

Localization Quality Assessment for Video Games and Eco-criticism

Video games, due to their media status as software, are primarily treated the same as other software types in their LQA. Thereby, the assessment components revolve around linguistic, functional/operational and cosmetic elements of the software as proposed by Esselink (2000) and translation and grammatical errors as perceived from the quality assurance metric from LISA (Localization Industry Software Association), as the most widely utilized model of LQA

(Costales, 2009). The problems with sole concerns with linguistic, functional/operational and cosmetic components are the possible negligence of file size increase after certain corrections are applied. In video games with cultural issues like Capcom's Final Fight for SNES (Super Nintendo Entertainment System), where several visuals like nude statues, liquor references and blood depictions are altered, the possibility for the game to suffer a file size shift is plausible, since this alteration requires a careful treatment to preserve the nuances of the original games. At the same time, it should but conform to the rule, norm and culture of the target market.

The above case indicates that corrections on linguistic and cultural errors trigger the emergence of environment-related issues. If this case is viewed from eco-criticism perspectives, it will show a deficiency in the product quality since an increase on data shift is a part of e-waste. The increase in file size also signifies that the roles of the localization team have not yet encompassed ecological concerns, knowing that these concerns are a significant part in electronic based product localization. Furthermore, localization, as a part of globalization, as implied by Retallack (2001), has to conform to the umbrella issues the global community faces with environmental issues being one of the issues. In the case of video games, the errors should not be covering only linguistic, cultural and legal matters, but also environmental matters. The errors these types of LQA concern are intertwined and linked to the mediality of the software, video games in this case, and thus, the corrections are mechanically accommodated. This concern on the mechanics as one of the possible causes of errors further suggests that the process of assessing the localization quality is executed in a proceduralist manner (Anastasiou and Schaler, 2010; Jimenez-Crespo, 2011; Dietz, 2007; Honeywood, 2007). This proceduralism on LQA implies that interdisciplinary components are open for a slot in the assessment if the components conform to the proceduralist nature of video games. To accommodate environmental concerns in LQA, the slot is allotted for eco-criticism.

GILT, Eco-Translatology and Textonomy

The word 'eco' in GILT (Globalization, Internationalization, Localization and Translation) perspectives might be related to (a) what Gengshen (2008; 2009), Gengshen and Tao (2016) term as eco-translatology, where they treat translation as a living being tested for survival in the textual world; (b) what Chang (2013) labels as ecological localization, where linguistic and environmental significances should be incorporated in any phases of the localization process and (c) what Valero-Garces (2011) calls as eco-criticism for translation studies, emphasizing on the

significance of bioregional culture and landscape in the process of translating a text. These three articles, though seemingly displaying different views on the incorporation and integration of environmental concerns in translation studies, share a derivative implication, namely corresponding quality assessment toward eco-translatology, ecological localization and eco-criticism-based translation studies. This implication is what this article attempts to fulfil, an eco-criticism based LQA focusing on file size shift and extra power consumption. Furthermore, the assumption is that the proposed eco-criticism perspectives should be articulated in structuralist and proceduralist manners. Aarseth's theory of textonomy is employed to structurise and proceduralise Clark's eco-criticism, the theory selected as the basis for the localization quality design.

Textonomy is the study of how texts are accessed by the users through their reciprocal functions with the users, namely interpretive, explorative, configurative and textonic (Aarseth, 1997; Eskelinen, 2012). In interpretive functions, users attempt to interpret the texts they access, while in explorative, users not only interpret the texts, but also explore them through links found, for instance, in html text. In configurative, users could influence the text through technical configuration as found from video games. In textonic functions, users could modify the already existent text as found from modded video games. Textonomy is selected for theoretical basis since it not only treats texts on the content mechanism, but also text from mechanics and users as parts of the mechanics. Thereby, in relation to video game (LQA), this mechanics-oriented nature of textonomy displays a linear mechanistic paradigm from which structuralist and proceduralist natures of video game LQA roots. Applying these functions to Clark's eco-criticism and anthropocene theories, a structuralist and proceduralist LQA is designed. Clark heavily discusses eco-criticism in a linkage with anthropocene theories, emphasizing on the mechanistic natures of the environment and its derivative elements (2015). This concern on the mechanism of nature indicates the corresponding paradigm on textonomy and video game LQA and, thereby, implies that the three LQA constructing design elements share connective perspectives.

Method

The Research Approach

This qualitative research employs formal approach for game studies by Lankoski and Björk (2015) to reveal and recognize the influence of localization on the structural assets of the

selected game titles. The titles are purposively selected based on one of the following criteria namely (1) games with multiple discs (2) games with file size difference between the original and the localized versions (3) games with digital distributions (4) games designed in an open world (5) games with extra peripherals to play them. Departing from the formal approach and these game titles, the research is conducted through five procedures. First, localized game assets indicating differences on file size are revealed. Second, the differences on file size are examined to reveal their increase and decrease. Third, the localized game assets are connected to the file size differences to recognize the textual and visual states of the localized assets. Fourth, the reasons behind the applications of localization like cultural, legal or mechanical issues, of which their importance in localization, as suggested by Di Marco (2007) and Edwards (2011), are prominent, are examined to perceive their relations with file size increase. Fifth, the user's functions of the game asset localization are revealed in regard to the emergence of differences in the file size of source and target games.

Data and sources of data

The data of this research are localized game assets which usher file size differences between the source games and the target ones. The titles analyzed were Square and Square Enix's Final Fantasy IV, Square's VII, Square's VIII, Square Enix's XIII, Square Enix's Final Fantasy X/X-2 HD Remaster, Media Vision and Contrail's Wild Arms 2nd Ignition, Monolith Soft's Xenosaga III: Also Sprach Zarathustra, Arc System Works' Blazblue: Calamity Trigger Portable, Capcom's Breath of Fire IV, Nintendo's Legend of Zelda: Ocarina of Time, Capcom's Super Street Fighter II Turbo, Capcom's Street Fighter V, Technos' Super Dodge Ball, Bandai Namco's Dragon Ball Xenoverse, Sega's Sonic the Hedgehog, Bethesda Softworks' Elder Scrolls V: Skyrim, Multiple DS Game Cartridge, Capcom's Final Fight, Polyphony Digital's Grand Turismo 6, and Rockstar's GTA San Andreas. Departing from the findings on this classification to which the textonomy is combined with the adapted theory of Clark's theories of ecocriticism and anthropocene, video game LQA with environmental concerns was constructed.

Data Collection Techniques

To reveal the presence of file shift, the data in .bin format were extracted from the selected games to provide an initial recognition on the file size between the original and translated games.

.bin data were then read by utilizing binary file reader to check textual shifts in the form of additions and subtractions. While performing the checking, the games were played to reveal shifts on visual, which might contribute to the file size shifts.

Data Analysis Techniques

This research employs domain, taxonomy, and componential analyses by Spradley (1980). In domain analysis, the collected data are classified based on their assets and the degree of their contribution to the file size increase. By classifying the data as such, the relationship between diegetic and non-diegetic elements realized into texts and visuals, from which file size increase might be possibly begotten. Exercising this classification, the structural and proceduralist analysis domain are laid to compose a taxonomic analysis. In the analysis of taxonomy, the contribution of game asset localization is intertwined with possible cultural, legal, or mechanical issues to reveal a connectivity between the file size increase with these possible issues. Componentially this connectionist perspective is structurally constructed to yield what we term as layers of assessment, with which the assessors will use to assess video game localization in regard to ecocriticism perspectives. following sub-headings should be used in this section.

Research Design

Research model and the reason why a specific model is chosen should be specified in this section. Research model should be explained with relevant literature. Also, research design should be explained in detail.

Result and Discussion

The Implementation of Eco-LQA

The user's function-based design, borrowing Aarseth's terms, consists of four layers of assessment, namely interpretive, explorative, configurative and textonic layers. These layers are designed in a spheric anthropocenic form to indicate the characteristics and the connectivity of the layers.

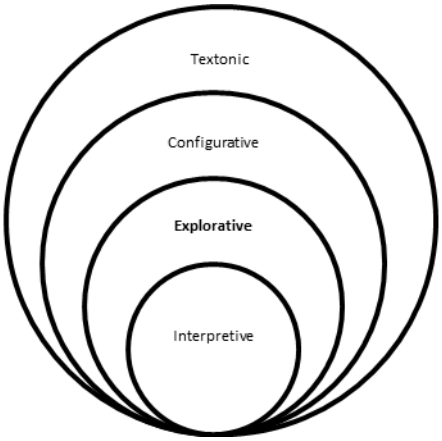

Figure 1 Layers of Localization Quality Assessment in Eco-LQA

Each layer is connected to other layers; therefore, in assessing the video game localization, environmental concerns revealed on each layer are assessed considering other layers. In Capcom's Breath of Fire IV, for example, the localization aimed from Japanese to the U.S. and European markets underwent significant impact on the file size. The original Japanese version of the title, Breath of Fire IV Utsurowazaru Mono, for PlayStation console is 136 MB in size, but shifts to 155 MB for the U.S. The reasons for this shift are (a) different characters between pictographic scripts, the kana in Japanese, with Latin scripts of English language; (b) the necessity to select certain language styles to characterise and distinguish certain characters; and (c) several censorship and additional features that require audio-visual adjustments. Conforming these adjustments to the target culture and market require a revisualization process, which might contribute to the file size uplift. Cultural, normal and legal problems emerging from Breath of Fire IV are located in the interpretive layer since such discussions are of interpretation domains. In this layer, the tasks of the assessors are to reveal the relationship between cultural, normal and legal contents of video games with potential environmental and ecological issues emerging from video game localization as perceived from file size shift. As the environmental and ecological issues are revealed, the assessors are required to assess the explorative layer of the localization.

In the explorative layer, the revealed issues from the interpretive layer are classified based on their triggering causes. The triggering causes of file size shift are classified into a narrative-triggered and mechanics-triggered file size shift. In narrative-triggered, the file size shift occurs due to the narrative content ranging from extensive addition to the game narratives and censorship related contents. The localisation of Final Fight experiences this trigger. Here, the

story is extended due to the localization for different game platforms. A different example is perceivable from Xenosaga III: Also Sprach Zarathustra. When the game is localised for the U.S. market, the localization team removes blood related scenes, but unlike Final Fight, the absence of re-visualization does not affect the file size uplift. In mechanics-triggered, the file size uplift results from the game mechanics spanning from game distribution methods, game distribution media and additional game peripherals. Game distribution methods consist of physical (cartridges, floppy disks and optical media) and digital (download) distributions. One of the examples is the existence of multiple Nintendo DS game cartridges. In this type of distribution, tens of games are compiled into a single cartridge. This illegal compilation forces the DS to perform a work that causes a bigger power consumption; thereby in eco-criticism perspectives, this condition is not that eco-friendly. This case does not imply that digital distribution serves better in ecological and environmental perspectives since downloading a large file is also power consuming. Thereby, an in-depth qualitative assessment through a comparison between physical and digital distribution is required by analysing the file size and e-waste possibilities. An in-depth analysis is also required concerning the sub classification of game distribution methods, game distribution media.

Physical distribution in video games covers cartridge, floppy disks and optical media, with each medium having its own ecological and environmental issues. Meanwhile, digital distribution primarily focuses on the media from which the data is downloaded, namely consoles, arcades, mobiles and PCs. In the case of localization, normal cases involve physically distributed games being localised into physical and vice versa. The case of localizing physical into digital and vice versa is a case not yet to be found. Dragon Ball Xenoverse and Street Fighter V for example were released in a simultaneous shipment (sim-ship) localization model for both physical and digital distributions. The presence of this sim-ship model, in eco-criticism perspectives, indicates that multi-platform game releases actually open a chance for the gamers to select what is best for them in terms of their ecological and environmental concerns, thus, strengthening the self-definition and one's position in environmental issues. This option to select what serves best for the gamers, in terms of eco-criticism is also perceivable from the presence of game peripherals.

Game peripherals are additional equipment required to achieve a total experience in playing certain games. Simulation racing games like Grand Turismo series require a wheel controller to experience a real driving experience; dancing games like Dance Dance Revolution series need a

dancing mat to function realistically; and Guitar Heroes series ask the gamers to plug in a guitar like controller to immerse them as a guitarist. These game peripherals, mostly dominated by controller like peripherals, require extra power; thereby, energy consumption comes as the issue. In the localization context, these peripherals are also of concern, since button function and pressing, as shown from the case of affirming an action, mechanically interacted from O button in Japanese and X in the U.S., are different across cultures. In relation to eco-criticism, this localization case is not yet proven as a contributor to eco problems, but the power consumption of the peripherals is of concern, as noted in the aforementioned examples from Breath of Fire IV and Final Fight. This game does not require additional a gaming peripheral to immerse the players onto the narrative driven game world. Meanwhile, Final Fight, due to its status as a ported game from the arcade version, the arcade atmosphere will never be felt by the gamers if their controllers are those of home consoles, SNES in this case. Therefore, they are required to replace the controllers with arcade-like controllers to immerse the players into the game. A similar case is also found from Blazblue Calamity Trigger. This fighting game was originally designed for an arcade, but its fame brought the title to consoles and handhelds. In the console, to emit an arcade nuance, the gamers have to purchase controllers specifically designed for fighting games, implying that power consumption might be an issue. In relation to eco-criticism, the latter opens a greater chance for extra power consumption due to the status of Final Fight being an arcade game.

After the assessors qualitatively assessed the triggering causes, they move to the configurative layer. In the configurative layer, the assessors assess the possibility of modding the games through SDK (Self-Development Kits), a tool allowing the players to modify or add new contents to the games, as well as DLC (Downloadable Content) features. These include additional contents from game developers aimed at adding extra gaming experiences for the players through the availability of new characters, quests or mechanics. The additive characteristics of these two features open a possibility for an uplift on the game file size; therefore, this uplift requires an environmental and ecological concern on the design. In the context of localization, SDK is contributing to localization when the modded contents reflect that of a certain target culture. Elder Scrolls V: Skyrim and GTA San Andreas are examples of how modding is vastly utilised to simply add characters, abilities and equipment to include the fans' own story and localization. Meanwhile, DLCs require localization, as they function like a short

complete sequel for the original title. In relation to eco-criticism and localization, an in-depth qualitative analysis onto the two features is required to provide a connective link with the previous explorative and interpretive layers. In the case of Breath of Fire IV and Final Fight, as they do not have any SDK or DLC, the quality analysis from eco-criticism does not touch the configurative layer, but in the case of Blazblue Calamity Trigger for console version, the game requires an analysis in the configurative layer since the title has DLCs. The analysis of SDK and DLCs revolves around whether the localization contributes to the file size uplift and extra power consumption or not. Possible severe level of file size uplift and extra power consumption occur more in the SDK-ed games than in DLCs due to the modding nature of SDK with vast possibilities to alter and convert any elements of the original games. The findings are related to whether the localization of the original games, coming from re-visualization (interpretive layer), contribute to file size uplift and extra power consumption. This tripartit relationship will contribute to a thorough assessment with file size shift and extra power consumption as the centre. This tripartit relationship, to obtain a qualified result, should be connected to the last layer, the textonic layer.

In the textonic layer, the assessment concerns platform porting, game reformatting to adjust the game with target platform, and game remaster and remake. Final Fantasy IV, Final Fantasy X/X-2 HD Remaster, Legend of Zelda: Ocarina of Time, Super Street Fighter II Turbo, Super Dodge Ball and Sonic the Hedgehog are examples how games underwent a remake for a different platform and a different generation of users. The necessity to adjust the games to different platforms and players requires the games to not only be remastered on visuals, but also on the game mechanics and narratives. These necessities are compensated with file size uplift, extra power consumption and extra plastic cases and physical distribution paraphernalia. In regards to localization, the remake games require additional localization for some additional game sections; this condition opens the possibility for file size uplift and extra power consumption. Super Dodge Ball, for instance, was originally released for arcade in 1987 in Japan under the title Nekketsu Kōkō Dodgeball Bu; since 1989 to 2015, it has been remade and remastered for various platforms that require more advanced visuals and mechanics for each generation. For 28 years, physical and digital distributions of the title have been disseminated. In the perspectives of eco-criticism under textonic layer, an assessor is first required to describe each platform. A game is remastered for and second, to analyse the potential ecological and environmental issues for

each platform. Performing the analysis, an assessor might reveal a remake pattern of the assessed games, to which a pattern of ecological and environmental issues is able to be located. Breath of Fire IV and Final Fight, due positive receptions, received a ported version. The former was ported to PC while the latter was ported to Sega CD, Sharp X68000, Game Boy Advance (GBA), PlayStation 2 and the Xbox. Breath of Fire IV displays several differences between console and PC ports, primarily regarding with resolutions, controls and in game features. Meanwhile, in Final Fight, you not only experience mechanical adjustments, but also the narratives like changing the title into Final Fight Guy, Final Fight One and Final Fight Double Impact. These adjustments are to address different platforms, different generations and fan demands.

The application of Eco-LQA as discussed above should be integrated with metric assessments to achieve an in-depth quality assessment toward video games. If the assessors plan to employ a quantitative assessment on the LQA, they are advised to focus on the minor and major damage in terms of environmental concerns, with the combination of quantitative based assessments like that of Esselink's, LISA or SAE.

Combining Metric Assessment with Eco-LQA

Eco-LQA should be integrated with metric assessment to achieve a comprehensive result on the assessment. We propose a classification of severity in relation to file size shift and extra power consumption. The following table will illustrate the classification:

Table 1

Classification of severity in relation to file size shift and extra power consumption

Severity Grades	**Points**	**Parameters**			
		File Size Shift	**Extra Power Consumption**	**Localization Model**	**Localization Level**
3d-iv	x4	< 500MB	In-Game Elements, Paraphernalia and Digital Distribution	Post Gold	Partial
3d-iii	x3.75		In-Game Elements, Paraphernalia and Digital Distribution	Post Gold	Full
3d-ii	x3.5		In-Game Elements, Paraphernalia and Digital Distribution	Sim-Ship	Partial
3d-i	x3.25		In-Game Elements, Paraphernalia and Digital Distribution	Sim-Ship	Full

3c-iv	x3	< 500MB	In-Game Elements and Paraphernalia	Post Gold	Partial
3c-iii	x2.75		In-Game Elements and Paraphernalia	Post Gold	Full
3c-ii	x2.5		In-Game Elements and Paraphernalia	Sim-Ship	Partial
3c-i	x2.25		In-Game Elements and Paraphernalia	Sim-Ship	Full
3b-iv	x2	< 500MB	In-Game Elements and Digital Distribution	Post Gold	Partial
3b-iii	x1.75		In-Game Elements and Digital Distribution	Post Gold	Full
3b-ii	x1.5		In-Game Elements and Digital Distribution	Sim-Ship	Partial
3b-i	x1.25		In-Game Elements and Digital Distribution	Sim-Ship	Full
3a-iv	x1	< 500MB	In-Game Elements	Post Gold	Partial
3a-iii	x0.75		In-Game Elements	Post Gold	Full
3a-ii	x0.5		In-Game Elements	Sim-Ship	Partial
3a-i	x0.25		In-Game Elements	Sim-Ship	Full
2d-iv	x4	100-500MB	In-Game Elements, Paraphernalia and Digital Distribution	Post Gold	Partial
2d-iii	x3.75		In-Game Elements, Paraphernalia and Digital Distribution	Post Gold	Full
2d-ii	x3.5		In-Game Elements, Paraphernalia and Digital Distribution	Sim-Ship	Partial
2d-i	x3.25		In-Game Elements, Paraphernalia and Digital Distribution	Sim-Ship	Full
2c-iv	x3	100-500MB	In-Game Elements and Paraphernalia	Post Gold	Partial
2c-iii	x2.75		In-Game Elements and Paraphernalia	Post Gold	Full
2c-ii	x2.5		In-Game Elements and Paraphernalia	Sim-Ship	Partial
2c-i	x2.25		In-Game Elements and Paraphernalia	Sim-Ship	Full
2b-iv	x2	100-500MB	In-Game Elements and Digital Distribution	Post Gold	Partial
2b-iii	x1.75		In-Game Elements and Digital Distribution	Post Gold	Full
2b-ii	x1.5		In-Game Elements and Digital Distribution	Sim-Ship	Partial
2b-i	x1.25		In-Game Elements and Digital Distribution	Sim-Ship	Full
2a-iv	x1	100-500MB	In-Game Elements	Post Gold	Partial
2a-iii	x0.75		In-Game Elements	Post Gold	Full
2a-ii	x0.5		In-Game Elements	Sim-Ship	Partial
2a-i	x0.25		In-Game Elements	Sim-Ship	Full
1d-iv	x4	> 100MB	In-Game Elements, Paraphernalia and Digital Distribution	Post Gold	Partial
1d-iii	x3.75		In-Game Elements, Paraphernalia and Digital Distribution	Post Gold	Full
1d-ii	x3.5		In-Game Elements, Paraphernalia and Digital Distribution	Sim-Ship	Partial
1d-i	x3.25		In-Game Elements, Paraphernalia and Digital Distribution	Sim-Ship	Full

1c-iv	x3	> 100MB	In-Game Elements and Paraphernalia	Post Gold	Partial
1c-iii	x2.75		In-Game Elements and Paraphernalia	Post Gold	Full
1c-ii	x2.5		In-Game Elements and Paraphernalia	Sim-Ship	Partial
1c-i	x2.25		In-Game Elements and Paraphernalia	Sim-Ship	Full
1b-iv	x2	> 100MB	In-Game Elements and Digital Distribution	Post Gold	Partial
1b-iii	x1.75		In-Game Elements and Digital Distribution	Post Gold	Full
1b-ii	x1.5		In-Game Elements and Digital Distribution	Sim-Ship	Partial
1b-i	x1.25		In-Game Elements and Digital Distribution	Sim-Ship	Full
1a-iv	x1	> 100MB	In-Game Elements	Post Gold	Partial
1a-iii	x0.75		In-Game Elements	Post Gold	Full
1a-ii	x0.5		In-Game Elements	Sim-Ship	Partial
1a-i	x0.25		In-Game Elements	Sim-Ship	Full

Severity is graded into a numerical manner 1-3 with sub grading in alphabetical manner a-d and roman numbers i-iv. The higher the number and alphabetical order, the higher the severity. Since the severity has a different level of grading, the points allotted to the grading are also different, depending on the level of severity. The severity grade of 1a-i and point x0.25 means that the point for severity level grade is 0.25, resulting from 1x0.25. The parameters utilised to yield the score, which indicates the level of severity in Eco-LQA perspectives, are file size shift, extra power consumption, localisation model and localisation level. First parameter, file size shift ranges from under 100 MB to over 500 MB. This range is selected since the additional file size after a game is localised is approximately on the range of the mentioned number for non-porting games. For porting games, the file size shift could be sporadically diverse, especially in games involving PC porting. As such, 100-500 MB are set as the axis to bridge porting and non-porting games. Second parameter, extra power consumption, focuses on game assets, which are possible to suffer additional power consumption after the games are localised. The game assets are in-game elements, digital distribution and paraphernalia. In-game elements, to which most of the localization process is applied, are considered to be the asset which contributes the most in the possible emergence of file size shift and extra power consumption and thereby, in-game elements are the primary consideration in this parameter. Third parameter, localization model concerns on whether the localization process is post gold, where the localization is exercised after the source game is launched or simultaneous shipment (sim-ship); where the localization process takes place at the same time where the game is designed (Arno, 2011; Mangiron and O'Hagan, 2006; 2013). Post gold model is assumed to have a freer hand in localizing a game than sim-ship and,

thus, if environmental issues emerge from this model, it implies that the localization team is not thorough in spotting and solving the issues. Fourth parameter, localization level concerns on whether the localization encompasses only texts, voices or both of them. Partial localization, which focuses on texts, is considered to trigger the least problem in environmental issues. If it is revealed that this consideration works vice versa, then, it is assumed that the localization team narratively or mechanically performs a poor process of localization.

To better illustrate the use of this metric, an example is given as follows. In Square's Final Fantasy X-2, the North American version has a 600 MB difference from the source Japanese version. Assessing this game with the above Eco-LQA metric shows that the severity grade is 3a-iii. This grade is perceptible from the findings that (a) the localised target game is more than 100 MB bigger in file size than that of the source, (b) there is graphical adjustment on the game cutscene where the main character performs a song, (c) post gold localization iss exercised after the Japanese version is launched, and (d) full localization, covering both text and voice. Departing from this grading, the scoring comes after. Based on the explanation above, the localization of Final Fantasy X-2 has a severity grading 3a-iii, implying that 3 on 3a-iii has to be multiplied by 0.75, as indicated from the point column. 2.25 is the result obtained from the multiplication. After the score is revealed, a qualitative rating and review should be presented to address the environmental issues in relation to file size shift and extra power consumption. In the Final Fantasy X-2 localization case, the cutscene adjustment indicates a file size shift, since a cutscene is produced through high-end graphics to mimic a nuance of realism to the characters. Adjusting it for a localization purpose contributes to the file size shift; it is further assumed that a bigger file size contributes to the emergence of extra power consumption from the consoles, utilised to play the game. Though the environmental aspects of the game are graded 3a-iii, which is high in severity, the fact that a 600 MB increase is still covered on the DVD data capacity for a PlayStation 2 console implies that the file size shift remains at a tolerable level. A similar case is found in Square's Final Fantasy VIII, which has four discs totalling around 1.7GB with approximately 400 MB in the North American version and 1.4GB overall, approximately 350MB per disc in the original Japanese version. The Compact Disc (CD) used by the game for the first generation of the PlayStation has up to 700MB data capacity; thereby, in relation to the presence of quadruple discs for the game, the game could have actually been stored on three discs only. In

Eco-LQA perspectives, limiting the potential emergence of e-waste is encouraged though mechanical and narrative concerns might be of loss in consideration.

Discussion

The proposed Eco-LQA exposes four weaknesses, which future studies could patch, namely energy consumption testing exclusion, commodified nostalgia, target gaming culture and DLC downloading time and storage. Though implied that more file size means more energy consumption, Eco-LQA excludes empirical calculation testing on the influence of file size uplift toward energy consumption with heat production as the focus. Thereby, to yield a maximum assessment with this Eco-LQA, it is encouraged to have a tandem with empirical testing on energy consumption.

The second weakness is commodified nostalgia, an engagement over a past product with present recontextualization (Cuff and Terry, 2017). Remake and remasters contribute to the file size uplift as found from thw *Final Fantasy X/X-2 HD* case, but their remakes and remasters are of necessity since they need to be recontextualised. This recontextualization is aimed at garnering new players while pertaining the same nostalgic nuances for veteran players. This Eco-LQA excludes this consideration and only perceives whether a file size uplift takes place or not.

The third weakness is the target gaming culture. Games sold to the target market not only consider cultural issues in general, but also the gaming culture. *Buff Knight*, for instance, has to be adjusted for the Indonesian gaming culture by adding an extra interface menu called lottery, from which gamers could draw a lottery, which might grant them specific useful in-game items. This feature is absent on the original game. The addition of this specific target gaming culture might disclose opportunities for a file size uplift. Eco-LQA addresses this cultural issue in general and leaves the assessment in a qualitative domain.

The fourth weakness is DLC downloading time and storage. Empiric, specific and systemic methods or techniques to reveal a stratum or a scale of e-waste in the context of carbon consumption. The result of Eco-LQA will be optimum if the methods or techniques have quantitative calculation with a particular stratum or scale on carbon e-waste. DLC storage might also indicate a weakness in Eco-LQA since this LQA excludes the possibilities for DLC storage in contributing to the energy consumption.

Conclusion

Game developers and their localization team could benefit Eco-LQA in tandem with other LQA models to minimise potential environmental issues that might occur from the localization process. Eco-LQA for video games consists of four layers, namely interpretive, explorative, configurative and textonic layers. The focus of Eco-LQA is to qualitatively and descriptively reveal whether certain games suffer from file size uplift and extra power consumption with localization as the trigger. In applying the LQA on video games, first, the assessors, in the interpretive layer, are required to analyse the cultural, normal and legal issues of the games, from which the localization might contribute to the emergence of file size increase and extra power consumption. After assessing the interpretive layer, the assessors are required to conduct an assessment on the explorative layer. In this layer, the assessors have to analyse the triggering causes of file size uplift and extra power consumption as revealed from the interpretive layer. These causes are then classified into narrative and mechanics triggers. Narrative triggers refer to any narrative game elements contributing to the increase on the file size, in while mechanics triggers focus on how game distribution methods, game distribution media and game peripherals contribute to the file size uplift and extra power consumption.

After revealing the triggering causes, the assessors move to the configurative layer. In this layer, the assessment is conducted to unveil whether the assessed games have SDK and DLC and whether or not their localization significantly contributes to file size uplift and extra power consumption. To close the assessment, the assessors will subsequently have to move to the textonic layer and determine whether or not the games have undergone remake, remaster and platform porting. After the status of remake and remaster of the assessed video games is revealed, the assessors have to find the pattern of remake and remaster from the assessed video game vitae, spanning from their first release to the latest. The purpose of this remake and remaster vitae is to comprehend the pattern of localization, which might contribute to the file size uplift and extra power consumption.

References

Aarseth, E.1(997). *Cybertext: Perspectives On Ergodic Literature*. Baltimore: The John Hopkins University Press.

Anastasiou, D., & Schäler, R.(2010). Translating Vital Information: Localisation, Internationalisation, And Globalisation. *Syn-Thèses Journal*, *3*, 11-25.

Arno, C. (2011). *Video Game Localization: A Tricky Game*. Gamedev.Net.

Bernal-Merino, M. Á.(2015). *Translation And Localisation In Video Games: Making Entertainment Software Global*. Routledge.

Bogost, I.(2008). *Unit Operations: An Approach To Videogame Criticism*. Mit Press.

Chandler, H. M., & Deming, S. O. M. (2011). *The Game Localization Handbook*. Jones & Bartlett Publishers.

Chang, A. Y. (2013). *Playing Nature: The Virtual Ecology Of Game Environments*. University Of California, Berkeley.

Clark, T.(2015). *Ecocriticism On The Edge: The Anthropocene As A Threshold Concept*. Bloomsbury Publishing.

Costales, A. F.(2009). Translation 2.0. The Localization Of Institutional Websites Under The Scope Of Functionalist Approaches. In *Selected Proceedings Of The Cetra Research Seminar In Translation Studies*.

Cuff, S., & Terry, C. (2017). Commodified Nostalgia and the Virtual Console. *The Evolution and Social Impact of Video Game Economics*, 15.

Dietz, F.(2007). " How Difficult Can That Be?"-The Work Of Computer And Video Game Localization. *Tradumàtica: Traducció I Tecnologies De La Informació I La Comunicació*, (5).

Di Marco, F.(2007). Cultural Localization: Orientation And Disorientation In Japanese Video Games. Traduccio I Technologies De La Informacio I La Comunicacio Numero 5.

Edwards, K.(2011). Culturalization: The Geopolitical And Cultural Dimension Of Game Content. *Trans*, (15), 19-28.

Eskelinen, M. (2012). *Cybertext Poetics: The Critical Landscape Of New Media Literary Theory*. Bloomsbury Publishing Usa.

Esselink, B.(2000). *A Practical Guide To Localization*. Philadelphia: John Benjamins Publishing.

Feder, H. M.(2014). *Ecocriticism And The Idea Of Culture: Biology And The Bildungsroman*. Ashgate Publishing, Ltd..

Gengshen, H.(2008). Eeo-Translatology: A Primer [J]. *Chinese Translators Journal*, *6*, 004.

Gengshen, H.(2009). On Fu Lei's Translation Philosophies: An Eco-Translatological Perspective [J]. *Journal Of Foreign Languages*, *2*, 010.

Gengshen, H. & Tao, Y.(2016). Eco-Translatology: A New Paradigm Of Eco Translation*–A Comparative Study On Approaches To Translation Studies. *T & I Review*, *6*, 115-132.

Honeywood, R.(2007). The Square-Enix Approach To Localization. In*presentation At The Game Developers Conference. San Francisco, March* (Pp. 5-7).

Jiménez-Crespo, M. A.(2011). To Adapt Or Not To Adapt In Web Localization: A Contrastive Genre-Based Study Of Original And Localized Legal Sections In Corporate Websites. *Jostrans: The Journal Of Specialised Translation*, *15*, 2-27.

Mandiberg, S.(2015). *Responsible Localization: Game Translation Between Japan And The United States*. University Of California, San Diego.

Mangiron, C. And Minako, O. **(**2006). *Game Localisation: Unleashing Imagination With 'Restricted' Translation*. Journal Of Specialised Translation Issue 6-July 2006 P.10-21.

Mangiron, C. And Minako, O. (2013). Game Localization: Translating For The Global Digital Entertainment Industry. Philadelphia: John Benjamins Publishing.

Mayers, K., Koomey, J., Hall, R., Bauer, M., France, C., & Webb, A. (2015). The Carbon Footprint Of Games Distribution. *Journal Of Industrial Ecology*, *19*(3),

Moore, C. L.(2009). Digital Games Distribution: The Presence Of The Past And The Future of Obsolescence. *M/C Journal*, *12*(3).

Retallack, S.(2001). The Environmental Cost Of Economic Globalization. *The Case Against The Global Economy. And For A Turn Towards Localization*.

Valero-Garces, C.(2011). Foreign Language Education And The Environment. Considerations From The Perspective Of Translation Studies.

Wath, S. B., Dutt, P. S., & Chakrabarti, T.(2011). E-Waste Scenario In India, Its Management And Implications. *Environmental Monitoring And Assessment*, *172*(1-4), 249-262.