MASTERARBEIT / MASTER'S THESIS

Titel der Masterarbeit / Title of the Master's Thesis

"Learning English with Lara Croft:

Digital gaming as English extramural exposure"

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 066812
Studienrichtung lt. Studienblatt / degree programme as it appears on the student record sheet:	Master's degree program English Language and Linguistics UG2002
Betreut von / Supervisor:	Univ.- Prof. Mag. Dr. Ute Smit

Acknowledgements

First and foremost, I would like to thank all the Lara Croft fans and the Tomb Raider players who volunteered to participate in the study and without whom this project would hardly be possible. I am grateful to all the participants who were patient to respond to the endless questions in my survey and courageous to take the Yes/No vocabulary test "full of errors", for their contribution. My special thank you goes to the members of the Facebook group *The World of Tomb Raider* and *Lara Croft Poland* for demonstrating the spirit of unity and cooperation.

Second, I would like to thank my supervisor, Professor Ute Smit, who spiked my interest to the field of Exramural English and surprisingly, to statistics. Thank you for being my mentor all the way through the nerve-racking process of the thesis writing and guiding my thoughts in the right direction, especially in the moments when I tried to embrace the immense.

And of course, I am deeply grateful to my big family for the continuous support and understanding on the way of achieving my personal goals. My sincere thanks and admiration go to my children who do not stop to surprise me with their growing expertness in the digital stuff and who inspire me to continuously learn, develop, share gained knowledge and be a great role model for them.

Abstract

Digital gaming as an English extramural exposure is a focal point of the emerging academic research which explores the potential of video games for informal English learning. The present research aims at discovering the mechanisms which account for the English receptive vocabulary acquisition through gaming. Given the multiple studies in the field of extramural English which predominantly highlight the massively multiplayer online role-playing games (MMORPGs), the present study focuses on the third person game, the recent Tomb Raider trilogy in particular.

The study zooms into the diversity of game micro- and macro-involvement activities aiming to explore the relationship between the frequency of exposures and the expansion of the English vocabulary. Therefore, several methodological instruments, such as a Tomb Raider walkthroughs corpus, an online questionnaire and a Yes/No vocabulary test are employed in the research. The detailed insights and results are based on the various SPSS statistical calculations and analysis.

The conclusions are expected to be informative for experts in the field of English learning and teaching. Also, the findings might spike the interest of general public because digital gaming as a multifaceted exposure helps people not only to stay connected with friends and families in our "always on" life but also suggests diverse dimensions for the English language learning.

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List of Abbreviations

EE Extramural English
ELF English as a lingua franca
EEQ Extramural English Questionnaire
GIIL The Gaming involvement and informal learning framework
IDLE Informal digital learning of English
L2 Second Language
MMORPG Massively Multiplayer Online Role-Playing Game
SDT Self-determination theory

In statistical analysis

CI Confidence interval
D Maximal absolute difference used in the Kolmogorov - Smirnov test
K Kurtosis
M Mean
Mdn Median
N Sample size
p p-value, level of statistical significance
r Pearson's correlation coefficient
r_s Spearman's rho or Spearman's correlation coefficient
range Measure of central tendency
S Skewness
SD Standard Deviation
SPSS Statistical package for social sciences

1. Introduction

Over the last few decades English has enjoyed the lead among world languages, retaining the status of the most spoken and learned language around the globe. Being employed in a wide range of domains from business and education to digital environments, English brings together speakers of different linguistic and cultural backgrounds, thus becoming their "lingua franca" (Seidlhofer 2011:7).

The phenomenon of English as a lingua franca is defined by Seidlhofer (2011:7) as "any use of English among speakers of different first languages for whom English is the communicative medium of choice and often the only option". Although ELF communication involves both English native speakers as well as non-native English speakers, in the context of the present research the focus will be placed on participants for whom English is not a native language.

Among multiple digital domains of the English use, computer video games have turned into virtual spaces where the omnipresence of English suggests innovative approaches for the English language learning different from those of traditional classroom instruction. Such extramural or out-of-classroom exposure to the English language in various digital environments allows non-native English speakers continuous engagement with informal English learning.

Moreover, a wealth of digital games belonging to different genres from puzzle and shooter to action and simulation games, offers players unlimited opportunities for social interaction, creation of new experiences, mental stimulation as well as incidental vocabulary learning, thus enriching players' lexicon with historical, cultural, geographical, military, archaeological, political etc. terms. Given the wide range of video games' genres and sometimes contradictory nature of certain of them, the choice of a digital game is a factor that can shape new lexis of a player.

This project aims at bringing evidence that the acquisition of English words occurs not only during classroom formal instruction but also through extramural English activities, such as digital gaming. As a multifaceted activity, digital gaming incorporates multiple linguistic

practices which occur during and after gameplay, thus opening possibilities for players to expand their vocabulary knowledge depending on the level of involvement in gaming.

Although a body of research in the field highlights predominantly the massively multiplayer online role-playing games (MMORPGs) suggesting gameplay socialization with others as the main stimulus of language learning, this study zooms into the different genre of video games, namely the third person action games, such as the epic Tomb Raider. The choice of the game is driven by the various geographical and cultural settings which allow Tomb Raider players virtual travelling across different countries, epochs and cultures, at the same time being exposed to incidental English vocabulary learning.

It should be noted that the topic-dependent lexis, such as geographical, archaeological, or cultural terms which Tomb Raider players encounter during gaming and in the game-related contexts, belong to low-frequency vocabulary which is usually not a focus of classroom instruction (Schmitt & Schmitt 2020:82). Therefore, it is of particular interest to explore the mechanisms of extramural acquisition of English vocabulary.

The research design employs several quantitative data collection instruments and the statistical software for social studies, IBM SPSS, to bring empirical evidence. The Tomb Raider corpus is compiled for the purposes of the study and is based on the game walkthroughs available in open access in the Internet. Furthermore, the corpus is analyzed with the help of AntWordProfiler to select topic-dependent words which are later used to construct a Yes/No vocabulary test.

The online questionnaire with the embedded Yes/No test is disseminated in the Tomb Raider Facebook fan groups, aiming to bring evidence that English vocabulary learning occurs through English extramural exposure to digital gaming, highlighting the mechanisms of vocabulary acquisition on micro- and macro-levels of game involvement.

In more detail, the targeted research questions are:

1. What is the gender frequency distribution across the Tomb Raider players?

2. What game activities on the micro- and macro- involvement levels are most practiced by the Tomb Raider players?
3. What is the performance of the Tomb Raider players in the Yes/No vocabulary test?
4. Is there a relationship between the performance in the Yes/No vocabulary test and the exposure to the variety of micro- and macro-involvement activities?
5. Is there a relationship between the performance in the Yes/No vocabulary test and the gameplay frequency per week?

Following this introduction, Chapter 2 will highlight the phenomenon of language learning beyond the classroom outlining its four specific dimensions, such as location, formality, pedagogy, and locus of control. These aspects became the areas of academic research giving rise to a diversity of terms, including the term "extramural" language learning. The chapter will bring accounts of the concept of Extramural English as suggested by Sundqvist and Sylvén (2009). Also, this chapter will zoom into digital gaming through the lenses of extramural English discussing recent studies in the field from different countries and touching upon the aspects of language learning, motivation and involvement.

Chapter 3 will account for digital games as learning spaces outlining the principles which turn digital games into active and critical learning environment. It will shed additional light on the aspects which foreground gaming as a learning environment and what makes a video game the *big G Game.* In Chapter 4 digital gaming will be approached from the standpoint of game studies. Touching upon the concepts of game presence and immersion, the Calleja's game involvement model will be outlined at large. Additionally, the concepts of gaming capital and paratexts in the context of digital gaming will be explained.

Chapter 5 will discuss vocabulary knowledge bringing accounts of Nation's framework which foregrounds word form, meaning and use as crucial constituents of lexical knowledge. It will also address the dichotomy of receptive and productive vocabulary knowledge. Chapter 6 will provide an overview of the research design focusing on the data collection instruments which have been developed to meet the needs of the research. As such, the compilation of the Tomb Raider corpus, the development of the Yes/No vocabulary test which is based on the game-

dependent lexis and the administration of the online questionnaire will be explained in three sequent sections.

The empirical evidence will be outlined in Chapter 7 describing the sample's demographic, linguistic and educational background as well as presenting responses to the research questions in relation to participants' game micro- and macro-involvement and the performance in the Yes/No vocabulary test. Chapter 8 will discuss the findings in light of the literature on extramural English learning through digital gaming which was discussed in the previous chapters. Additionally, the limitations and recommendations for further research will be also highlighted. In the conclusion of this thesis, Chapter 9 will summarize the key findings.

2. Language learning beyond the classroom and Extramural English

Given the omnipresence of the English language in our everyday life, there are more opportunities for language learning not only in institutional settings but also beyond the classroom contexts and during our leisure time. Therefore, the scientific research in the field of language learning beyond the classroom has been rapidly emerging over the last decades.

Due to the multifaceted and complex nature of the phenomenon, the focus of the numerous studies has been traditionally placed on four specific dimensions of language learning beyond the classroom, namely location, formality, pedagogy, and locus of control, which as a result, gave rise to a wealth of terms, such as ""out-of-class", "out-of-school", "after-school", "extracurricular", and "extramural"; "non-formal" and "informal"; "self-instructed", "non-instructed", and "naturalistic"; "independent", "self-directed" and "autonomous" language learning"" (Benson 2011:9).

Moreover, it should be stressed that continuously evolving technologies open for learners new digital learning spaces which contribute to enhancing speaking, writing, reading abilities as well as expansion of vocabulary. As such, informal language learning being a focus of the interest in the field of computer assisted language learning (CALL) gave rise to concepts of informal digital learning of English (IDLE) (Lee & Dressman, 2017), ecological CALL (Chun, 2016), naturalistic CALL (Chik, 2013) and normalization of CALL (Bax, 2011) (Lee 2019:768).

As Schwarz (2020:6) reasonably notes:

> The emerging research field concerned with learning (and teaching) outside formal educational contexts lies at the intersection of several research strands. Currently, these strands often only overlap to a very limited extent, although greater integration could inform theoretical conceptualizations and promote the clarification of terminology within related discourses.

2.1. Language learning beyond the classroom

To understand and explain language learning beyond the classroom Benson (2011:15) proposed a framework which allows analysis and description of the subject matter through the lenses of four dimensions, namely location, formality, pedagogy and locus of control. From Benson's (2011:9) standpoint location or setting "imply something that is supplementary to classroom learning and teaching". As such, activities which occur out-of-class and are voluntarily carried out by students to expand their knowledge are defined as out-of-school language learning (Benson 2011:9). They should be differentiated from afterschool, extracurricular or extramural activities which are viewed by Benson (2011:9) as "additional programs in school that are less formal than regular lessons and possibly organized by students themselves".

Even though Benson uses the term extramural in the context of additional school activities, the concept of extramural learning in this project is used in parallel with out-of-school learning, because as Sundqvist & Sylvén (2016:9) reasonably note the concept of location refers not only to physical spaces but also illustrates relationships between learners and others within social and pedagogical contexts. In addition, in her project Schwarz (2020:8) also uses "extramural" as a synonym for "out-of-school" in accordance with Benson's continuum, which is illustrated in Figure 1.

Furthermore, the dimension of formality as illustrated in Benson's continuum (Schwarz 2020:8) suggests the contrast between formal teaching and learning and non-formal or informal learning. Benson (2011:10) defines formal learning as the one which "takes place in educational institutions and involves classroom teaching and officially recognized qualifications". At the same time Benson (2011:10) stresses that non-formal learning frequently occurs in school settings but does not necessarily involve assessment or certification, while informal learning implies individual learning projects and can involve tests and qualifications as well.

In this connection, Benson (2011:10) agrees on the definition of informal learning which was proposed by Livingstone (2006:206) as the one which corresponds the most to the conceptualization of learning beyond the classroom. As such, according to Livingstone

(2006:206) “informal learning is any activity involving the pursuit of understanding, knowledge, or skill that occurs without the presence of externally imposed curricular criteria”. Additionally, Livingstone (2006:212) elaborates that informal learning is “anything people do to gain knowledge, skill, or understanding from learning about their health or hobbies, unpaid or paid work, or anything else that interests them outside of organized courses”.

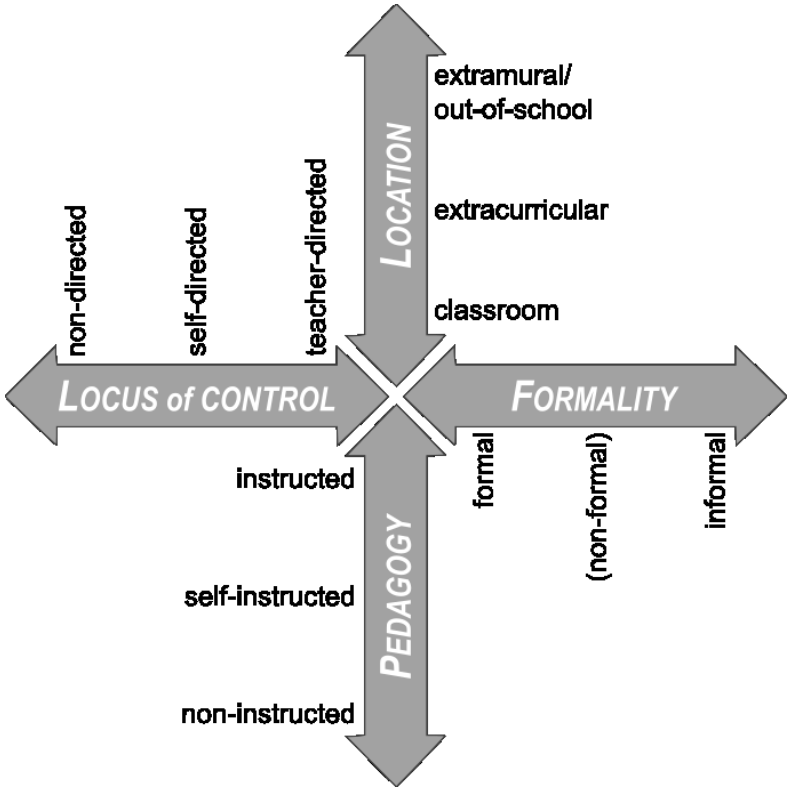

Figure 1. Benson’s framework of language learning beyond the classroom (Benson 2011:7-16 as illustrated in Schwarz 2020:8).

The third dimension of Benson’s framework brings account of different types of pedagogy employed in language learning beyond the classroom. As such, Benson (2011:11) draws a distinctive line between instructed and self-instructed, non-instructed and naturalistic learning and places them on two ends of pedagogical continuum. From Benson’s (2011:11) standpoint instruction is viewed as a formal process grounded on “sequencing of material, explicit explanation, and testing”, while self-instruction and naturalistic learning are learner-led and occur out of classroom. The difference between self-instructed and naturalistic learning Benson (2011:11) explains as follows:

> In self-instruction, specially designed books or television and radio broadcasts take on the role of classroom instructor and there is a strong intention to learn on the part of the learner, while in naturalistic learning, there is no instruction or specially designed materials and […] no intention to learn.

Benson (2011:11) also singles out common situations of self-directed naturalistic learning, when learners' intention of language learning is replaced with the focus on communication, fun and learning something new than just language. Additionally, Benson (2011:11) stresses that classroom language learning is not a solely instructed process but it can also involve other forms of learning such as naturalistic learning that occurs beyond the classroom settings, which is indicative of the multifaceted nature of the dimension of pedagogy.

The fourth dimension of locus of control refers to the control over learning and is often described by the terms independent, self-directed and autonomous language learning (Benson 2011:12). As a rule, these terms refer to learner-directed learning where the locus of control is shifted from a teacher to a learner. Benson (2011:12) points out a questionable relationship between the locus of control and location, since contemporary language education can offer different options for language learning. However, a clear relationship between language learning in out-of-class settings and locus of control where a learner acts as a decision-maker is also observed (Benson 2011:12).

Furthermore, from Benson's (2011:13) standpoint language learning beyond the classroom is characterized by the complex interplay of the aspects of location, formality, pedagogy and locus of control. Placing a particular emphasis on the dimension of location, Benson (2011:13) understands location not as a geographical position but as a social space or setting, which is defined as "an arrangement for learning, involving one or more learners in a particular place, who are situated in particular kinds of physical, social or pedagogical relationships with other people (teachers, learners, others) and material or virtual resources".

The learning activities which occur in different settings are modes of practice which are defined by Benson (2011:14) as "a set of routine pedagogical processes that deploy features of a particular setting and may be characteristic of it". In addition, Benson (2011:14) singles out "the

relative independence of settings and modes of practice", which means that a setting can involve a variety of modes of practice, thus demonstrating interplay of all aspects of language learning beyond the classroom.

In addition, Schwarz (2020:14) underlines that among the variety of language practices that learners are involved in, it is difficult to draw a distinctive line between pedagogical processes and social processes as well as to investigate this difference from an empirical perspective. As such, Schwarz (2020:11) proposes the definition of mode of practice including intentional and incidental learning as "a set of routine social practices which are located in and deploy features of a particular setting, involve target language use and have pedagogical potential". Hence, Schwarz's definition fits well the focus of the present study and is interwoven with the theoretical framework of language learning beyond the classroom and the concept of extramural English.

2.2. Extramural English

The understanding of the place of extramural English in the domain of English learning is important in the context of the present project because it accounts for relationship between the English learning in out-of-school settings and learners' involvement, either deliberate or voluntary, in the language learning. From Sundqvist & Sylvén (2016:11) standpoint the conceptualization of extramural English includes all English language practices that learners can benefit from. Extramural English, the term proposed by Sundqvist in 2009, is defined as follows (Sundqvist & Sylvén 2016:6):

> In extramural English, no degree of deliberate intention to acquire English is necessary on the part of the learner, even though deliberate intention is by no means excluded from the concept. But what is important is that the learner comes in contact with or is involved in English outside the walls of the English classroom. This contact or involvement may be due to the learner's deliberate (thus conscious) intent to create situations for learning English, but it may equally well be due to any other reason the learner may have. In fact, the learner might not even have a reason for coming in contact with or becoming involved in extramural English.

The situations where learners get into contact with the English language voluntarily are usually leisure activities, such as watching movies, TV series, music videos and vblogs; reading books, magazines, newspapers and blogs; listening to music; surfing English websites and various Internet platforms; playing digital games (Sundqvist & Sylvén 2016:7). Even practiced in informal contexts, extramural English learning contains input, output and interaction, the essential constituents of second-language learning (Sundqvist & Sylvén 2016:7).

Therefore, dwelling on Benson's theoretical framework of language learning beyond the classroom, Sundqvist & Sylvén (2016:10) developed a theoretical model that "solves the problem of the connection between location and learner control" and accounts for the place of extramural English in the domain of L2 English language acquisition. For the graphical visualization of the model of extramural English see Figure 2.

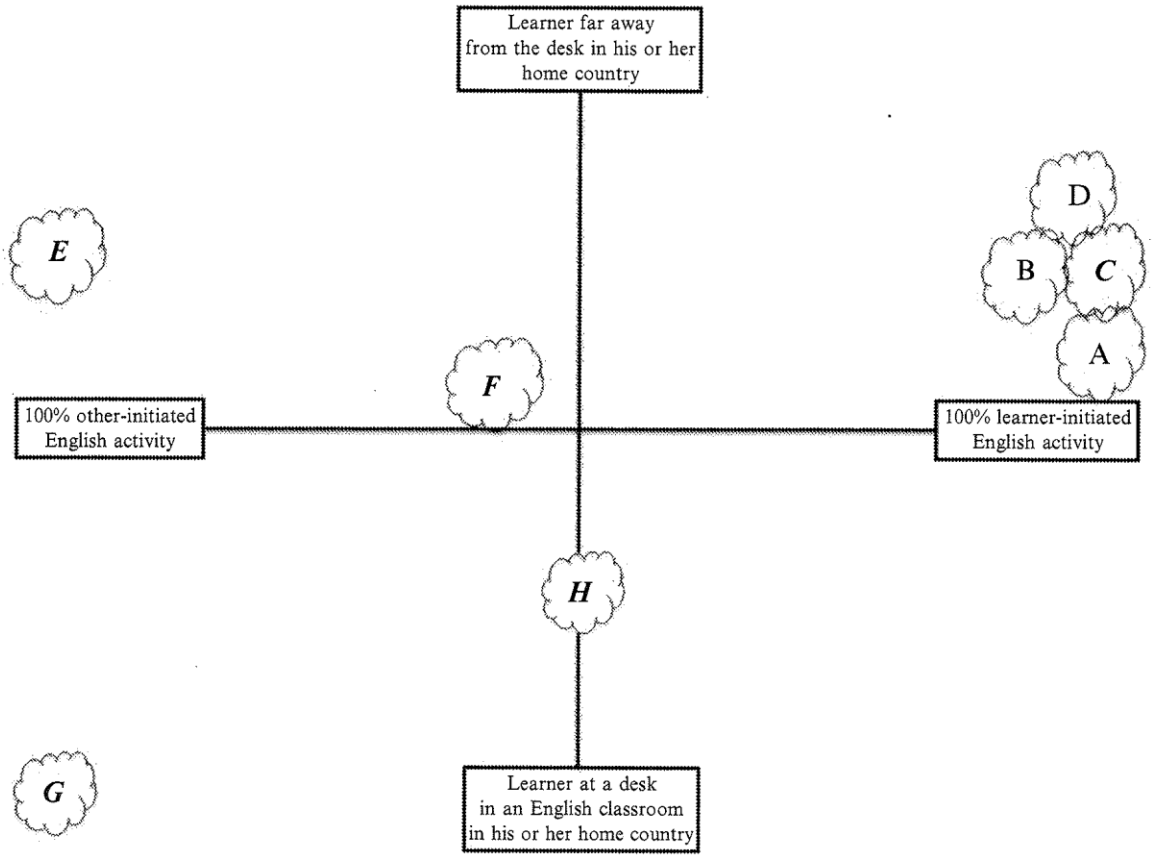

Figure 2: Two dimensional continuum of extramural English (Sundqvist & Sylvén 2016:10)

According to Sundqvist & Sylvén (2016:11) the model represents a two-dimensional continuum consisting of two constituents, namely physical location which is illustrated by the vertical axis and locus of control or learners' motivation for learning English which is represented by the horizontal axis. The location axis demonstrates a range of language learning settings from classrooms in a learner's home country to a wealth of informal settings, including the home, a school canteen or foreign country (Sundqvist & Sylvén 2016:12).

Furthermore, Sundqvist & Sylvén (2016:12) emphasize that the majority of extramural English practices, illustrated with the letters A-D, are located in the upper right-hand corner of the coordinate system, meaning that such EE activities are usually learner-initiated; occurring beyond the classroom or at home; practiced for the purpose of entertainment or language learning; accessing Internet resources. While the activities, illustrated with the letters E-H, are teacher-initiated (E,G) or teacher-and-learner-initiated (F,H), practiced for the purpose of English learning either independently or in groups.

In addition, Sundqvist & Sylvén (2016:11) note that involvement in extramural English activities does not require any action from the side of a learner, stressing that "the doing of an activity could simply mean that a learner is exposed to English (for instance, there is an ad in English in a newspaper)". Even though the present coordinate system includes classroom as location and teacher's control over a learning process, the model demonstrates the dynamic nature of English learning process when a teacher-initiated classroom activities located below the horizontal axis, can be transformed into learner-initiated extramural English practices illustrated in the upper-right quadrant of the chart (Sundqvist & Sylvén 2016:14).

2.3. Digital gaming as English extramural exposure

Nowadays, technological innovations along with abundance of online English-mediated resources provide boundless opportunities for incidental informal language learning, thus facilitating extramural learning of English in many countries of the world (Sundqvist & Sylven 2016:25). The pool of typical English extramural activities is very broad, from watching films, TV programs, video blogs to web surfing, following on social media and digital gaming. Since

digital games can encompass all the salient components needed for L2 learning, especially if they are interactive and involve multiple players, digital gaming is believed to be an excellent English exposure which boosts the acquisition of L2 vocabulary (Sundqvist & Sylven 2016:171).

It is worth mentioning that over the last decade Sundqvist and Sylven conducted a number of studies describing how extramural exposure to various types of media and games by Swedish school learners influences the development of English vocabulary. For instance, Sundqvist (2011:108) investigated the connection between oral proficiency, vocabulary and different extramural activities among 36 boys and 44 girls.

The results revealed a clear relationship between boys' high scores in vocabulary tests and their involvement in extramural activities, namely playing video games and surfing the Internet which accounted for 43% of their total time spent on extramural exposure in comparison to 6% of the girls' total time (Sundqvist 2011:108-112). At the same time, correlation between test performance and extramural activities among girls was non-significant (Sundqvist 2011:108-112).

Sundqvist (2011:115) explains the difference in vocabulary tests performance among two gender groups by the boys' habits of playing digital games and browsing the internet in English. Sundqvist (2011:116) notes that gameplay involves specific tasks in English which account for development of spoken and written L2 skills, namely through written and spoken communication with other players. Moreover, Sundqvist (2011:115) singles out motivation and aptitude as additional variables that have an impact on the students' vocabulary scores and development of oral proficiency.

The joint research by Sylven & Sundqvist (2012: 311) also foregrounds digital gaming as the most popular extramural English activity among Swedish teenagers where online multiplayer role-playing or first-person shooter games were the first choice among boys and single-player simulation games were preferable among girls. The study aimed to investigate whether amount of time spent on gaming correlated with language proficiency. Depending on amount of hours

dedicated to gaming per week, participants were clustered into three groups, such as non-gamers, moderate gamers and frequent gamers (Sylven & Sundqvist 2012: 312).

The results on the vocabulary test demonstrated a clear pattern, namely that frequent players (mean score 25.4) outperformed moderate gamers (18.5) who in their turn performed better than non-gamers (16.6). As such, Sylven & Sundqvist (2012:302) confirm the previous study and conclude that frequency of gaming and types of games correlate with L2 English proficiency.

Jensen (2017: 1-19) conducted the study focusing on 144 Danish young learners of English, the results of which to a large extent mirror the previous research in other countries. The focus of this study was placed on extramural activities practiced by Danish young learners aged 8 and 10 years old and identifying a positive relationship between gaming and L2 vocabulary knowledge. Gender was also included in the research as an independent variable (Jensen 2017:5).

The findings from 122 EE one-week diaries along with the scores on the Peabody Picture Vocabulary Test (PPVT4) reveal that young learners weekly engage in EE activities (Jensen 2017:5). Moreover, girls prefer passive activities, such as listening to music and watching television, while boys predominantly engage in digital gaming and watching television (Jensen 2017:6). Furthermore, the findings show that boys traditionally spend more time on gaming than girls (Jensen 2017:6).

The most popular gaming categories were games with both oral and written English input, followed by games with only oral English input and games with English text only (Jensen 2017:7-8). The games with Danish input (oral or written) were not investigated since their percentage was insignificant (Jensen 2017:8). Games with oral English input and with both oral and written input were the most preferable among boys (Jensen 2017:11). The games with both oral and written input show strong correlation with vocabulary scores; it can be explained by strong motivation of players to understand the input, thus advancing in a game (Jensen 2017:12). Jensen (2017:14) stresses that original language input being frequently repeated during a gameplay is salient for language learning.

2.4. Motivation, gaming involvement and informal learning

Exploring digital games as supplementary instruments in developing English proficiency, Wu et al. (2014:65-83) conducted a study based on self-determination theory (SDT) with the focus on psychological aspects related to motivation. According to Wu et al. (2014:66, 69) the context of quality MMOPPGs games is designed in such as way that its specific features can motivate players to meet psychological needs outlined in self-determination theory (SDT), namely autonomy, competence and relatedness.

The study aimed at investigating how a MMORPGs game, Everquest 2, can be used by 19 casual gamers or non-gamers as alternative learning tool to support communicative use of the English language in a framework of triangulation mixed-method research design (Wu et al. 2014:65). The sources of data collection were semi-structured interviews, surveys and gameplay observations (Wu et al. 2014:65).

The findings revealed that socialization, relationship and teamwork were the built-in game features in Everquest 2 and viewed by male and female gamers as the ones that increased the use of English in communicative purposes (Wu et al. 2014:77). Additionally, the results showed that both male and female gamers spontaneously engaged in communication with other in-game players with the aim of exploring the environment (Wu et al. 2014:78). They also formed small groups to proceed with the gameplay or to get acquainted with the virtual game world (Wu et al. 2014:78).

Furthermore, all 19 participants in their responses to the survey and in the interviews stressed the importance of developing a sense of relatedness in playing Everquest 2 and using English for communicative purposes which reinforces the significance of the motivation as a component of relatedness (Wu et al. 2014:78). Other findings underline the importance of teamwork, especially when players share common goals in accomplishment of quests together (Wu et al. 2014:79). As such, socialization, relationship and teamwork complement each other (Wu et al. 2014:79).

Wu et al. (2014:81) conclude that MMORPGs Everquest 2 can engage both gamers and non-gamers during gameplay and also motivates players to use English for communication. This means that MMORPGs games can be used as an additional tool to traditional classroom instruction on the subject of second-language learning (Wu et al. 2014:81). Ultimately, the authors of the study sum up "we believe digital games help to address a key challenge confronting our current education system - a lack of student engagement" (Wu et al. 2014:81).

Deviating slightly from the previous studies, Iacovides et al. (2014:61) approach digital gaming as a virtual learning environment trying to account for players' motivation and engagement in various gameplay- and game-related practices as a driving force in the games based learning. In 2011 Iacovides et al. (2011:11) placed the focus of research on gamers' identity and conducted an interview-based study which demonstrated that different levels of participation in gaming communities were defined by players' identity as a gamer.

Consalvo's (2007) overview of paratexts as of additional sources for the development of gaming capital was incorporated in Iacovides' research shedding additional light on the connection between informal learning and identity (Iacovides et al. 2011:11). Describing the portraits of the casual player and the gamer, Iacovides et al. (2011:12) suggest that identity and community are the factors which might account for the reasons why people are playing games, the ways of players' engagement in gameplay- and game-related activities as well as of how informal learning occurs through games.

In a later study, Iacovides et al. (2012:321-327) investigate the relationship between adult players' involvement with games, their identity as gamers and language learning. Analysing the data of 232 respondents Iacovides et al. (2012:324) single out four groups of players, namely casual gamers (22%), moderate gamers (51%), hardcore gamers (14%) and non gamers (13%). Moreover, observing certain variability in each group Iacovides et al. (2012:324) conclude that frequency of gameplay is not the only factor which influences the choice of players' identity.

Furthermore, investigating the frequency of game related activities across all participants, Iacovides et al. (2012:324) conclude that certain practices become a daily routine or are practiced

several times a week, such as, for instance, visiting a gaming forum, blog or website; reading or watching game reviews; watching a game trailer; contributing to a gaming forum, blog or website; listening to game related podcasts.

As such, observing players' participation in gaming communities and semiotic domains, Iacovides et al. (2012:326) stress that "it appears more common for players to *use*, rather than *contribute to*, resources or create their own". In addition, Iacovides et al. (2012:326) note that players' identity as gamers has an impact not only on their frequency of gameplay and of game-related activities but also strongly influences their attitude to what they learn from gaming.

Grounded on the aforementioned studies, Iacovides et al. (2014:611) propose the Gaming involvement and informal learning (GIIL) framework which describes the interplay between identity, game involvement and learning. Based on the interviews with players and a wider survey, the research integrates the concepts of the Player Involvement Model (Calleja 2011, cited in Iacovides et al. 2014:614) and the previously mentioned concept of gaming capital (Consalvo 2007, cited in Iacovides et al. 2014:614).

The Player Involvement Model (Calleja 2011, cited in Iacovides et al. 2014:614) foregrounds external activities, distinguishing between micro-involvement or "moment-by-moment engagement of gameplay" and macro-involvement concerning "issues of motivations and sustained engagement with digital games through the long term" (Iacovides et al. 2014:614).

Moreover, the concept of "gaming capital" (Consalvo 2007, cited in Iacovides et al. 2014:614) is developed to expand on the activities that occur outside of gameplay. Learning from game-related contexts significantly contributes to gaining new knowledge, experiences and skills required for a successful completion of a game. Therefore, external resources which ensure acquisition of gaming capital are defined as paratexts, such as, for instance, reviews, guides, YouTube videos, blogs, magazines related to gaming. Iacovides et al. (2014:614) stress that the concept of gaming capital and paratexts play a significant role in the analysis of involvement and informal learning in relation to community membership.

As such, outlining Calleja's reconceptualization of motivation and engagement as the forms of macro-and micro-involvement, Iacovides et al. (2014:615) single out three categories of informal learning through gaming. The first category, *learning through play*, is related to learning on a game level or micro-involvement level, whether this is a single player- or multiplayer game (Iacovides et al. 2014:616). The second category, *learning with others*, is related to learning through interaction with other gamers on a macro-level or outside of game (Iacovides et al. 2014:617). The list of game-related activities include asking for advice, discussing results of a game or future strategies, participation in offline game forums, membership in guilds or game clubs (Iacovides et al. 2014:617).

The third category, *learning through external resources,* is represented by 1) *learning via game paratexts* and 2) *learning via tangential sources* (Iacovides et al. 2014:618). Learning via game paratexts includes consulting a gaming resource, for example, a manual or an Internet walkthrough, reading updates on gaming news, checking game reviews, etc. (Iacovides et al. 2014:618). The second subcategory, *learning via tangential sources*, implies consulting an external resource, for instance Wikipedia or a book. Iacovides et al. (2014: 618) emphasize that tangential resources are different from paratexts because they are not designed for a specific game or a game genre.

According to Iacovides et al. (2014:622) gamers' higher levels of involvement lead to a greater variety of learning and a stronger sense of identity. In conclusion, Iacovides et al. (2014:622) emphasize that "the gaming involvement and informal learning framework highlights the importance of the gamer identity in relation to increasing participation in a variety of gaming practices and what players learn as a result".

Furthermore, most recent research on the relationship between quantity and quality or diversity of informal digital learning of English (IDLE) practices and English proficiency highlights that engagement in a variety of digital practices contributes to positive language achievements (Lee 2019:767). For instance, Lee & Dressman (2018:435-444) assessed English vocabulary test performance and English speaking proficiency of 94 Korean students majoring in English in relation to their participation in a range of IDLE activities.

Lee & Dressman (2018:438) classified IDLE practices into two groups, namely form-focused and meaning-focused activities. The form-focused activities, such as exercising grammar in Google, English-Korean translation in Google, browsing online dictionaries, watching pronunciation lessons on youTube, etc., suggested intentional focus on linguistic structures, their learning and use. While meaning-focused IDLE practices, such as reading news in social media, watching movies, playing digital games and chatting with friends in messenger implied unintentional language learning in naturalistic digital spaces (Lee & Dressman 2018:438).

The data analysis indicated the involvement in diversity of IDLE practices with the preference for the meaning-focused activities (Lee & Dressman 2018:439). Moreover, the quality of IDLE experiences significantly correlated with students' performance on productive vocabulary test and speaking scores. Lee & Dressman (2018:443) sum up that "this study offers new insights into how the quality (or diversity) of out-of-class digital English learning, not quantity (or total amount) of such kind, can be particularly beneficial to those outcomes".

A year later, in 2019, Lee (2019:767-778) explored the relationship between quantity and quality of IDLE activities and performance on productive and receptive vocabulary tests among Korean students. Her findings challenged the previous research in the field because frequency of IDLE practices was not correlated with the vocabulary test scores (Lee 2019:773). In contrast, quality of IDLE showed significant correlation with scores in both receptive and productive vocabulary tests. Therefore, Lee (2019:775) claims that diversity of form- and meaning-focused IDLE practices significantly contributes to vocabulary learning and adds that her study corroborates with the earlier research in the field highlighting close relationship between speaking proficiency and the diversity of digital English activities.

3. Digital gaming as a learning space

Since a wealth of research indicates that digital gaming as a type of extramural exposure can be a valuable source of language learning, it is worth to approach digital games from different standpoints and to discuss different facets of gaming as a process in order to understand certain characteristics and mechanisms which turn these virtual environments into learning platforms as well as active social spaces at the same time.

3.1. Game, metagame and a big G Game

Gee & Hayes (2012:129) claim that well-designed games can be an efficient source of learning given their good learning principles which incorporate problem-solving spaces and engagement with other players. Even though a broad range of game genres exist, Gee & Hayes (2012:129-130) claim that "good games have good games mechanics", namely problem-solving rules and strategies, leading a player through a gameplay to his or her advantage, thus motivating to achieve goals and win.

Furthermore, Gee & Hayes (2012:130) argue that learning through gaming is due to the socialization during gameplay and outside of it by means of engagement in the game-related social practices or interaction on both sides. This phenomenon gave rise to the concept of metagame which can be interpreted from Latin as ""game beyond the game" and refers to the aspects of game play that derive not from the rules of the game, but from interplay with surrounding contexts" (Salen & Zimmermann 2003:481).

Furthermore, Salen & Zimmermann (2003:481) continue that "metagaming refers to the relationship between the game and outside elements, including everything from player attitudes and play styles to social reputations and social contexts in which the game is played". For instance, metagame activities can be after game conversation about the match, memorizing words in the Scrabble dictionary, discussion of game strategies, etc; in other words "any activity that links the game to outside contexts" (Salen & Zimmermann 2003:481-482).

Additionally, Gee & Hayes (2012:130) proposes to distinguish between the term *game* as downloadable software from the creator's website and the concept *metagame* as a pool of social activities occurring during or after the game and the *big G Game* as a combination of both, the game and the metagame. In this connection, Gee & Hayes (2012:130) suggest to reinterpret the statement "good games are good for learning" as "good Games are good for learning".

Moreover, modern game design allows players multiple options for modification of game designs which can result in improvement of interaction between mechanics and human interaction during gameplay as well as development of design communities around the game (Gee & Hayes 2012:131). Hence, by offering innovative design features, games educate players to learn new technological skills which can be used by players to their advantage to succeed in a game. That is why Gee & Hayes (2012:131) refers to these games as *big G Games* with a plus, *Games+*, noting that "Games+ are particularly good for learning".

3.2. Active and critical learning through gaming

In his seminal work Gee (2003) brings accounts of informal learning through gaming and argues that "video games have the potential to lead to active and critical learning" (Gee 2003:46). Gee (2003:18) defines video games as a semiotic domain or "any set of practices that recruit one or more modalities (e.g., oral or written language, images, equations, symbols, sounds, gestures, graphs, artifacts, etc.) to communicate distinctive types of meanings".

According to Gee (2003:18) semiotic domains can also be "cellular biology, postmodern literary criticism, first-person-shooter video games, high-fashion advertisements, Roman Catholic theology, modernist painting, midwifery, rap music, wine connoisseurship — through a nearly endless, motley, and ever-changing list".

Furthermore, Gee (2003:23) stresses that engagement in a semiotic domain enhances active and critical learning. Gee (2003:23) singles out three constituents of active learning, such as "*experiencing* the world in new ways, forming new *affiliations*, and *preparation* for future learning". For instance, active learning occurs when a player has new experiences and feelings

during a game, when new social connections are built with other players, and when gained experience and skills can be used for future learning (Gee 2003:23).

Gee (2003:23) continues that transformation of active learning into critical learning occurs when a semiotic domain turns into the space which engages and influences people, creates identities as well as offers opportunities for social networking and valued thinking. “The learner needs to learn not only how to understand and produce meanings in a particular semiotic domain that are recognizable to those affiliated with the domain, but, in addition, how to think about the domain at a “meta” level as a complex system of interrelated parts” Gee (2003:23).

It means that to learn from gaming actively and critically, players need to learn not only game content, mechanics and problem-solving strategies during gameplay, but they also have to actively participate in the affiliated social circles as well as in additional social practices (Gee 2003:23). In total, providing a list of 36 learning principles built into video games Gee (2003:197) differentiates between them according to design, psychological, linguistic, cultural, and social aspects. Moreover, Gee (2003:205) foregrounds identity as an important constituent of learning through video games which “are an immensely entertaining and attractive interactive technology built around identities”.

Stressing that video games offer players possibilities to take on a virtual identity and even create a new one enriching it with personal hopes, values and feelings, Gee (2003:67) notes that players learn not only about the virtual world but also about themselves and their possible powers. As such, Gee (2003:190) points out that “learning is a change not just in practice, but in *identity”.* At the same time, such identification with virtual spaces and personalities can be transformed into a driving force for learning on different levels as well as gaining new experience (Gee 2003:199).

Another important point which is worth bringing to discussion is the situated meaning principle. Gee (2003:83) stresses the importance of video games as spaces where the nature of situated or contextualized meaning can be clearly observed during gameplay. From Gee’s (2003:26) standpoint understanding situated meanings is an active learning which occurs through reflection

on the context and semiotic domain; at the same time, players learn in practice how to embed a meaning into the particular context of a semiotic domain.

Gee (2003:24) explains that aside from general meaning which is known for players, semiotic domains have powers to build particular contexts where words, artifacts, actions and images acquire contextual meaning. Hence, the learning principle of situated meaning accounts for the construction and understanding of a situation-specific meaning by a player and a game by means of game specific actions and use of images and materials of the virtual world (Gee 2003:24). According to Gee (2003:24):

> To understand or produce any word, symbol, image, or artifact in a given semiotic domain, a person must be able to situate the meaning of that word, symbol, image, or artifact within embodied experiences of action, interaction, or dialogue in or about the domain. These experiences can be ones the person has actually had or ones he or she can imagine, thanks to reading, dialogue with others, or engagement with various media.

Furthermore, out of the full list of learning principles it is worth pointing out some which are directly related to the subject matter of the present research. For instance, the situated meaning principle is tightly related to the text principle and the intertextual principle. Gee (2003:108) notes that understanding of situated meanings and contents of a particular game occurs not by means of learning general meaning of terms but through embodied actions built in the context of a game. As such, gained embodied experience in related texts allows players to understand texts belonging to different genres of games which is accounted for the intertextual learning principle.

Drawing conclusions from Gee's (2003:24) abovementioned statement, it becomes evident that video games function as virtual social spaces. Connecting players into social networks or affinity groups which are committed to shared goals and not shared gender, culture or race, video games thus offer opportunities for gaining new social experiences (Gee's 2003:24). In addition, Gee (2003:192) notes that members of an affinity group are united by involvement in "a *common endeavor* organized around a whole process" and possess a set of individual skills as well as knowledge which they gain from and share with other members.

Gee (2003:193) stresses that “in such affinity groups, people are committed through their immersion in practice, since it is the practice itself that gives them their identity and not some “occupation,” fixed set of skills, or culture apart from the practice”. Since involvement with the semiotic domain practices as well as belonging to an affinity group are viewed by Gee as important constituents of active and critical learning, it is worth to shed additional light onto these aspects, however, this time from different angle.

4. Digital games as environments of human engagement

This chapter approaches digital gaming from the standpoint of game studies, briefly zooming into the phenomenon of presence or immersion and outlining the Player Involvement Model in particular. Games are defined as "a complex social phenomenon" which "reflect aspects of the society and culture that made them while contributing to that society in the process; as a result, understanding them is a recursive process of exploration into collective knowledge and social practices" (Calleja 2011:7-8). In addition, Calleja (2011:8) reasonably notes that "a game becomes a game when it is played; until then it is only a set of rules and game props awaiting human engagement".

4.1. Understanding presence, immersion and involvement

The phenomenon of human engagement or presence in virtual reality was the subject of investigation since the mid 20th century. Initially, cinema was viewed as the medium which created "a total and complete representation of reality…a perfect illusion of the outside world in sound, color and relief" (Bazin 1967:20 as cited in Calleja 2011:17). Later, the development of technologies turned virtual reality from solely visual space into interactive virtual environment, thus giving rise to the phenomenon of "being there" which was discussed as the phenomenon of presence or immersion by different groups of scholars (Calleja 2011:18).

First, the term *presence* was proposed by Marvin Minsky (1980) to describe "the awareness of the potential to act within two spaces: the physically proximal and the physically remote" (Calleja 2011:18). The sense of presence or the sense of "inhabiting the distant space" is triggered by the interplay of agent's actions and the subsequent visual, audio and touch feedback (Calleja 2011:18). As such, Minsky's line of thought led to the conceptualization of the presence theory, which aimed to define the presence in order to shape up the design of virtual spaces and the hardware that creates them (Calleja 2011:19).

Even though the two terms of *presence* and *immersion* were initially used interchangeably, over time, the concept of immersion was articulated from different standpoints and gained an

additional meaning (Calleja 2011:21). The term *immersion* happened to be the most disputable one in the scientific circles because it applied not only to the field of game studies but was used to describe experience of non-ergodic media as well, such as painting, literature and cinema, where engagement in the virtual environment qualitatively differed from the one suggested by the game spaces (Calleja 2011:18).

Therefore, from Slater's standpoint (Slater 2003 as mentioned in Calleja 2011:21) immersion denoted "the affective properties of the hardware, while presence is the psychological response to this technology". Drawing a distinctive line between immersion and presence where immersion is approached as a form and presence as content, Slater (2003) stresses that among different people immersion may account for different levels of presence as well as various immersive systems may have little influence on the virtual presence.

It should be also noted that with the development of computer graphics and audio effects the term *immersive* was widely employed by game software producers to promote their games on the market, thus giving the term immersion a new meaning of " a positive experiential quality of games that is desirable for the consumer" (Calleja 2011:25).

Furthermore, Slater (2003) distinguishes the concept of involvement from presence claiming that involvement or interest belongs to "a different logical level" and is an emotional response to content. Also, Calleja (2011:34) suggests to zoom into involvement as a "prerequisite" to experience of presence in virtual spaces.

Calleja (2011:34) calls for developing a model which would account for the understanding of players' involvement with virtual game environment through describing different forms of involvement. Moreover, Calleja (2011:34) stresses that an understanding of these multiple forms of involvement will shed light on how they interact in consciousness creating a sense of presence.

4.2. Player Involvement Model

The Player Involvement Model is an outcome of Calleja's (2011:36) three-year qualitative study on two famous but different by genre video games, namely World of Warcraft, a massively multiplayer online role-playing game, and Planetside, a massively multiplayer online first person shooter game. The data were collected through author's personal engagement with both the games, focus groups and interviews with twenty five hardcore players on their experiences connected to immersion (Calleja 2011:36). Hence, Calleja (2011:36) notes that the Player Involvement Model was developed as a result of data analysis which was discussed with experts in the field.

Calleja (2011:36) continues that the data analysis demonstrated the necessity to differentiate between "micro-involvement" or "aspects of a game which engaged players in the moment of playing" from "macro-involvement" or "aspects that attracted players to the game initially and kept them returning to the game over time". Each phase of involvement incorporates various types of experiences which are classified by Calleja (2011:43) into six dimensions.

Furthermore, Calleja (2011:39) explains that macro phase is usually characterized by continuous engagement with a game and long-term motivation which can be traced across all six dimensions of involvement, for instance, "coming up with winning strategies or planning how to develop one's character (ludic involvement), wondering how the designed narrative surrounding a particular character will develop (narrative involvement), or working on a community website for one's guild (shared involvement)". Also, Calleja (2011:40) notes that majority of respondents stressed on strengthening of social connections through continuous involvement with a game.

The micro-involvement phase is tightly connected with ergodicity which is characterized by the active participation in and interaction of a player with the virtual environment which occurs by means of game mechanics and hardware (Calleja 2011:41). Calleja (2011:41) continues that ergodicity is expressed not only through the player's actions which are displayed on the screen but also through gamers' "cognitive effort", such as, for example, planning a move which is not considered "a form of input" or an action.

According to Calleja (2011:37) the Player Involvement Model is represented by six dimensions of involvement related to micro- and macro-levels and experienced unconsciously by players during gameplay and before or after it. As such, the following six categories are singled out by Calleja (2011:38): "kinesthetic involvement, spatial involvement, shared involvement, narrative involvement, affective involvement, and ludic involvement".

According to Calleja (2011:67) kinesthetic involvement accounts for learning and fluent movement of avatar and game piece control in the virtual world. Positive game experiences are usually gained through efficient control of movements in the virtual space which also stimulates experiences different from those in the reality (Calleja 2011:67). Calleja (2011:71) emphasizes that fluency in movement and control of it is an important condition which ensures successful ergodic involvement in the game world.

Furthermore, spatial dimension accounts for how players locate themselves in the virtual environments and explore spatial landscapes not merely through imagination as in non-ergodic respresentations but through navigation by moving from one location to another, which are represented by various spatial structures, such as multicursor corridors, maze, open landscapes, arenas, etc. (Calleja 2011:74-86). Internalizing game environments through space controls and navigation, players gain the sense of presence in the game world which is a quite different experience from simply observing the space (Calleja 2011:92).

Shared involvement is related to interaction and communication with other players or computer controlled agents in the game environments (Calleja 2011:112). Shared involvement incorporates various forms of interaction, such as direct communication in group chats, talking over game strategies with other players, discussing game club politics, etc. Even in computer - human interaction, the presence of avatar plays an important role because it "creates a broader engagement with the world community" (Calleja 2011:94). Moreover, Calleja (2011:94) stresses that digital games are designed "to foster persistent social structures that create a sense of being in a living, breathing world".

Narrative involvement accounts for players' experience of game contexts (Calleja 2011:113). Moreover, Calleja (2011:120-124) differentiates between experiences gained through exposure to *a scripted narrative* which is designed by a game software and *alterbiography*, the story generated during moment-to-moment actions with the focus on a character or a group of characters. Unlike literature and cinema, a particular feature of digital games is that players are offered opportunity to influence a game storyline by choosing different move options (Calleja 2011:132).

Affective involvement deals with various emotional states which are triggered either by game designs, player's perception of game contexts or interactions with others (Calleja 2011:146). Digital games offering a wide range of emotional experiences including escapism or sense of fleeing from unpleasant and undesirable situations, are frequently employed as a remedy from boredom (Calleja 2011:146).

Ludic involvement is related to acquisition and interaction with game rules; structuring and achievement of game goals; strategies planning either individually or in cooperation with other players; obtaining rewards as forms of motivation to perform new skills in the game world, etc (Calleja 2011:147-165). From Calleja's (2011:165) standpoint ludic involvement is the fundamental category of any game because challenging players with cognitive objections, directing them to a goal and rewarding them for successful decision making, games create a sense of accomplishment, satisfaction and excitement with the player.

The Player Involvement Model describing a wealth of experiences that players gain during macro- and micro-phases of game involvement was successfully shaped up in the contexts of informal learning and analyzed in the studies by Iacovides et al. As such, the Gaming involvement and informal learning framework by Iacovides et al is based on macro- and micro-involvement approach and additionally incorporates the concept of game paratexts and gaming capital suggested by Consalvo (2007).

4.3. Gaming capital and paratexts

According to Consalvo (2007:176) "gameplay does not exist in a vacuum" which means that game developers and players themselves have a huge potential to mutually influence gameplay experiences and expectations. Consalvo (2007:176) claims that aside from game design and content which is embedded in a game by game creators, "player-created content—in the form of free walkthroughs, online guides, postings and discussions on game boards, and free or shareware programs to help players in their games to varying degrees—all are important influences on how we understand digital games".

Drawing parallels with Bourdieu's (1984) concept of cultural capital, Consalvo (2007:4) goes further developing the term "gaming capital" which stands for the interaction of players with games, other players, information on games and game industries. Consalvo (2007:18) stresses that belonging to a game culture is much more than simply playing a game, but rather "being knowledgeable about game releases and secrets, and passing that information on to others. It's having opinions about which game magazines are better and the best sites for walkthroughs on the Internet". Therefore, acquisition, formation and use of gaming capital is an indispensable attribute of effective gameplay (Consalvo (2007:4).

The development of gaming capital occurs by means of different texts which belong either to the game industry or are created by players themselves. Consalvo (2007: 21-22) explains that "what might have begun as the peripheral aspects of the game industry (magazines, strategy guides, and so on) can now be recognized as such a paratext quite easily". The term of paratext which "constitutes all of the elements surrounding a text that help structure it and give it meaning" was coined by Gennette (1997) and adopted by Consalvo (2007:21) to game contexts.

Players-generated game-related content constitutes an important element of gaming capital. Available for free, game walkthroughs, blogs, reviews, videos, etc., are valuable sources of information either for players or game developers (Consalvo 2007:22). It is worth mentioning that paratextual aspects of gaming capital are closely related to gameplay performance and experiences, because gaining information from various types of paratexts, such magazines

reviews, sequel releases, game guides, etc, players expand their gaming capital and learn “how to be a gamer” (Consalvo 2007:22).

As Consalvo (2007:182) notes “the paratext becomes critical to consider as a way to understand gameplay as well as the business of digital games”. In this connection, Iacovides et al. (2011:4) successfully integrates the concept of paratexts and elements of gaming capital acquisition in the Gaming involvement and informal learning framework which aims to account for mechanisms of English language learning through digital gaming.

5. English vocabulary knowledge

This chapter is focused on vocabulary knowledge as an indispensable component of English language proficiency. Along with reading and speaking, sufficient vocabulary is a prerequisite for fluent language use and successful communication. However, vocabulary learning is a continuous process which begins at the early age and keeps developing throughout a lifetime (Eyckmans 2004:10-12). Eyckmans (2004:12) explains that the incremental growth of vocabulary is illustrated by the "transfer from receptive to productive mastery" which means that a speaker uses a word correctly if he or she understands the spoken and written form of it.

5.1. How many words does one have to learn?

It is hard to estimate the exact number of words in the English language and how many of them an English non-native speaker has to learn. There is no general consensus on the size of English word stock because its measurement depends on the counting unit, such as for example, token, type, lemma, or word family, which is used to define a word (Schmitt & Schmitt 2020:9).

As such, a contemporary corpus-based approach allows quantitative analysis of large-scale corpora which can bring estimates of 10 million individual words per a trillion-word English corpus (Brysbaert et al. 2016:2-3 as cited in Schmitt & Schmitt 2020:9). Alternatively, a dictionary-based perspective illustrates completely different measurements of English vocabulary. For example, the *Oxford English Dictionary* numbers over 600,000 words (https://www.oed.com/) but as Schmitt & Schmitt (2020:8) reasonably note "many of these are historical and no longer in general use".

In 1990 a group of researchers calculated the number of word families in *Webster's Third International Dictionary (1963)* which contained a non-historical word collection of English (Schmitt & Schmitt 2020:8). It turned out that the dictionary included 54,000 word families excluding proper names and alternative written forms (Schmitt & Schmitt 2020:9). A word family implies the knowledge of a word base along with its inflected and some derived forms (Nation & Waring 1997:8). Moreover, further findings indicate that out of 54,000 word families

in *Webster's Third* English dictionary, an educated native speaker knows approximately 20,000 but uses only around 3,000-5,000 word families for comprehension and 2,000-3,000 for productive speaking and writing (Nation & Waring 1997:10).

The most recent study by Brysbaert et al. (2016:8) also stresses the importance of age and education level in vocabulary learning. As such, the study on American English native speakers indicates the average number of 42,000 lemmas (or 11,100 word families) known by 20-year-olds and correspondingly, that one of 48,200 lemmas (or 13,400 word families) known by 60-year-olds (Brysbaert et al. 2016:8).

Furthermore, Brysbaert et al. (2016:8) underline that "quite a lot of lemmas can be known based on the mastery of a limited number of prolific base words", where the base words stand for the word families. Moreover, Brysbaert et al. (2016:10) further conclude that the estimates of the receptive word knowledge indicate that "productive knowledge is thought to be roughly half of receptive word knowledge".

The vocabulary size of non-native English speakers has always been a subject of animated discussions among scholars. Schmitt & Schmitt (2020:13) claim that second language learners need to achieve a vocabulary size of 2,000-3,000 word families to understand everyday English speech. Moreover, they have to master 6,000-9,000 word families, if they want to communicate on specialized topics and to understand authentic written English texts (Schmitt & Schmitt 2020:13).

Nation & Waring (1997:9) recommend second language learners the approach suggesting the acquisition of English words which frequently occur in the spoken and written texts. In this connection, Nation & Waring (1997:11) stress that for a non-native speaker the priority is to start building up a vocabulary of 1,000 high frequency words and continue with the strategies which help to learn low frequency words as well as to increase vocabulary size not only in the classroom settings. As a method of acquisition of huge number of words Nation & Waring (1997:11) recommend indirect or incidental learning.

Unlike the proliferation of lexical studies in the field of vocabulary acquisition, development and assessment, the research on vocabulary learning in extramural contexts is quite limited (Schwarz 2020:28). Moreover, the basic aspects of vocabulary knowledge should be briefly explained because it is obvious that word knowledge is a multifaceted and complex process which implies acquisition of a wide range of information about a word.

5.2. What is vocabulary knowledge?

It should be noted that there are three approaches which attempt to bring accounts of the concept of word knowledge, namely a component approach, a developmental approach and a metaphorical approach (Milton & Fitzpatrick 2014:1). The first framework of vocabulary knowledge was proposed by Richards (1976:83) who outlined the multifaceted nature of vocabulary learning which went beyond just memorizing the meaning of a word but encompassed also learning of various facets of a word (Read 2000:25).

In 1990 Nation employed Richard's framework to construct the most comprehensive analysis of what it involves to know a word, foregrounding knowledge of word form, word meaning and word use as the main components of knowing a lexical item (Milton & Fitzpatrick 2014:4). In 2003 Nation proposed a refined tabulated illustration of his word-knowledge taxonomy (Schmitt & Schmitt 2020:33).

Milton & Fitzpatrick (2014:4) elaborate on Nation's taxonomy explaining that word form category includes knowledge of spoken and written form of a lexical unit as well as knowledge of its inflected and derived forms. Furthermore, the word meaning implies not only simple meaning of a word but also knowledge of concepts and referents as well as other words associated with this lexical item (Milton & Fitzpatrick 2014:5).

The final category of word use signals the knowledge of grammatical characteristics, collocations and contexts where words can be used (Milton & Fitzpatrick 2014:5). Moreover, each category is simultaneously analyzed on two levels of receptive and productive vocabulary knowledge describing in total 18 aspects of word knowledge (Milton & Fitzpatrick 2014:6).

Form	spoken	R P	What does the word sound like? How is the word pronounced?
	written	R P	What does the word look like? How is the word written and spelled?
	word parts	R P	What parts are recognizable in this word? What word parts are needed to express this meaning?
Meaning	form and meaning	R P	What meaning does this word form signal? What word form can be used to express this meaning?
	concept and referents	R P	What is included in the concept? What items can the concept refer to?
	associations	R P	What other words does this make us think of? What other words could we use instead of this one?
Use	grammatical functions	R P	In what patterns does this word occur? In what patterns must we use this word?
	collocations	R P	What words or types of words occur with this one? What words or types of words must we use with this one?
	constraints on use (register, frequency...)	R P	Where, when, and how often would we expect to meet this word? Where, when, and how often can we use this word?

Figure 3: What is involved in knowing a word (types of word knowledge) (Nation 2013:49)

It should be noted that Nation's table illustrates an ideal scope of word knowledge which can hardly be mastered by native speakers themselves. However, partial mastery of numerous facets for many words is quite realistic also for advanced language users (Schmitt & Schmitt 2020:33). Nation's approach demonstrates that knowledge of word form, meaning and use is crucial for a correct use of a word. Even though some components, such as word form and meaning can be learned through instruction, knowledge of word use, namely collocations, register and frequency, is usually acquired through a great deal of language exposure (Schmitt & Schmitt 2020:34).

A developmental approach focusing on the incremental nature of vocabulary learning attempts to bring accounts of word knowledge from three standpoints, namely "1) partial - precise knowledge of word meaning, 2) depth of knowledge of the different word-knowledge aspects, and 3) receptive knowledge - productive knowledge" (Schmitt & Schmitt 2020:34). Since the conceptualizations of depth of knowledge and receptive/productive knowledge are directly related to the subject matter of the present study, these dimensions should also be highlighted.

5.3. Receptive and productive vocabulary knowledge

The dichotomy receptive knowledge and productive knowledge or as it is also known passive and active mastery is the most common one in the field of vocabulary learning and teaching (Schmitt & Schmitt 2020:37). Nation (2001:24) defines this distinction as follows: "receptive carries the idea that we receive language input from others through listening or reading and try to comprehend it, productive that we produce language forms by speaking and writing to convey messages to others".

Read (2000:154) holds that "it is generally assumed that words are known receptively first and only later become available for productive use". And that point on the vocabulary developmental continuum where a word undergoes transformation from its receptive status to its productive status, is hard to locate (Read 2000:154). Also Schmitt & Schmitt (2020:37) note that there is a blurred connection between these statuses: the research in the field indicates that among learners receptive knowledge prevails over productive knowledge.

Drawing on a variety of studies related to measurement of receptive and productive vocabulary, the results of which indicate huge divergence in scores, Schmitt & Schmitt (2020:37) claim that this inconsistency can be accounted for by the types of tests used for the evaluation of receptive and productive knowledge. Various test formats were used for assessing both receptive and productive word knowledge, such as checklist, multiple-choice, translation and illustration (Read 2000:155). Hence, the choice of the right test format is required for evaluation of each type of vocabulary.

It is also worth mentioning the terminology which is used when receptive/productive word knowledge is tested. The terms of word *recognition* and *recall* frequently occur in vocabulary tests and are defined by Read (2000:155) as follows: "recognition here means that the test- takers are presented with the target word and are asked to show that they understand its meaning, whereas in the case of recall they are provided with some stimulus designed to elicit the target word from their memory".

Additionally, the framework which was developed to define recognition and recall knowledge, posits that *meaning recall* stands for receptive knowledge, because when someone reads or listens to a text, he/she has to recognize the word form and then to recall the meaning of it (Schmitt & Schmitt 2020:38). Likewise, *form recall* stands for productive knowledge, because in the written or spoken speech, the meaning of a word comes first and then it has to be represented by its recalled or retrieved written or audio word form (Schmitt & Schmitt 2020:38).

Obviously, knowing a word implies much more than merely recognizing it in a pool of words. As Cameron (2002: 149-150) notes the aspects of deep lexical knowledge, such as spelling, word associations, semantic and morphological information of target words are markers of vocabulary development and its productive use in communication. However, even though the estimation of vocabulary size through word recognition sheds light only on one facet of vocabulary complexity, its importance lies in shaping up the outer contours of vocabulary knowledge where deep lexical knowledge is related to word recognition (Cameron 2002:150).

Taking into account the above mentioned descriptions of vocabulary knowledge, the selection of the best test format for effective vocabulary assessment of its various aspects becomes more transparent. The evaluation of vocabulary size (or the number of words known) and vocabulary depth (or the quality of words known) is a popular approach to test vocabulary development of language users (Nation 2001:354). Among a wealth of vocabulary tests, the choice of one in the frames of the present project is placed on the Yes/No vocabulary test which measures receptive vocabulary of English non-native speakers.

The outline of the Yes/No vocabulary test highlighting its general format description, history, scoring methods as well as the description of the newly created Yes/No vocabulary test along with the selection of the scoring formula which meet the purposes of the present study will be discussed at length in the following chapter on the methodology.

6. Research design and data collection instruments

This chapter zooms into the research methodology employed in the context of the present study. The following sections will outline in details the key data collection instruments, namely the compilation of the Tomb Raider corpus, creation and administration of the online Tomb Raider questionnaire as well as construction of the Yes/No vocabulary test.

The choice of a videogame as an object of investigation in the present research was placed on the rebooted Tomb Raider trilogy, namely Tomb Raider (2013), Rise of the Tomb Raider (2015) and Shadow of the Tomb Raider (2018). Since its first release in 1996 Tomb Raider and its long-standing sequels with immortal Lara Croft as a first videogame female protagonist have not lost their popularity among millions of players up till now. Over the last decades Tomb Raider heroine became an influential cultural icon who also featured in three films and came out on the covers of 1200 magazines worldwide (Engelbrecht 2022:325). Given Lara Croft international acclaim, innovative features in the game design and global network of fans, the game suggests players an immense environment for socialization and learning, which turns Tomb Raider in the big G Game+ as explained by Gee & Hayes (2012:131).

According to the action and adventure settings of the Tomb Raider series, the game creators situate the action heroine in various hostile environments where she has to survive hunger, weapons, dangers, wild animals, etc., in order to proceed to the next level and finally to complete the game. Navigating with Lara, a treasure hunter, worldwide from Egypt and Mexico to Japan and Siberia, players have the opportunity to come across geographical, archaeological or cultural terms which they might rarely encounter beyond the game environments or in their everyday use. In this connection, Tomb Raider game settings can be a valuable source of research of lexical acquisition by players.

Although the scientific research on language learning through Tomb Raider is quite limited, it is worth mentioning that the pivotal figure of Lara Croft has made a stir in the field of gender studies being a focus of research in multiple studies. For instance, the analysis of two incarnations of Lara Croft as “old Lara” and “new Lara” by Engelbrecht (2022:325) can shed

additional light on gender distribution in the Tomb Raider digital game environment which has been traditionally viewed as a male space.

6.1. The Tomb Raider corpus compilation

Digital gaming is an emergent field of research in linguistics. Even though contemporary corpus linguistics proposes various methodologies to conduct a study, certain concerns still might arise when doing lexically oriented searches in the area of digital games. For instance, Burghardt & Tiepmar (2021:14) point out that "in the case of video games, […] the question arises as to how such a highly interactive and dynamic medium can be formalized and modeled in a way that allows it to be analyzed computationally". In order to ensure a quantitative analysis of games, Burghardt & Tiepmar (2021:14) suggest "to focus on their textual dimension: their language".

However, as a visual art digital games usually do not offer much of textual material, that is why the source data for the lexical analysis is sought in game's walkthroughs or guides, which provide detailed description of a game, episode by episode, thus helping players to reach 100% completion of a game. Notwithstanding the fact that certain complex, creative or not goal-oriented game genres can provide insufficient walkthrough descriptions, Burghardt & Tiepmar (2021:14) still agree that "walkthroughs are a great source of textual game preservations that enable large-scale corpus analyses".

As a rule, such walkthroughs, which are widely available in the electronic format, do not belong to a game franchise but are written by individual authors and are usually copyrighted. Therefore, in order to proceed with corpus linguistic methodologies, it is highly recommended to receive an authorial permission beforehand. Additionally, Rayson (2015:37) stresses that "out-of-copyright texts are more readily available, otherwise publishers need to be contacted to secure access and obtain copies of the data".

Given the specific focus of research and the genre of walkthroughs, the present project will not be based on *general* corpora, such as the Brown Corpus, the British National Corpus, or the Corpus of Contemporary American English (COCA) to name a few (Davies 2015:11). As

McEnery & Hardie (2012:2) reasonably note “the importance of our findings from a corpus, whether quantitative or qualitative, depends on another general factor which applies to all types of corpus linguistics: the corpus data we select to explore a research question must be well matched to that research question”.

In this relation, it should be mentioned that the existing *Game Walkthrough Corpus (GWTC)* can be used only as a starting point. Even though it consists of walkthroughs for over 6000 games collected from different websites, the database does not contain full-text documents to avoid copyright violation. Therefore, it has been decided to employ a web-as-corpus (WaC) approach (Rayson 2015:33), and compile a machine-readable Tomb Raider-based corpus. As such, according to the methodology for corpus construction and processing as described by Rayson (2015:33), three important phases were followed, namely 1) corpus compilation, 2) annotation, and 3) corpus retrieval.

At the initial stage, the Tomb Raider trilogy walkthroughs in English were sought in the web. The source data were retrieved from tombraiders.net website and stored in the TXT format for record keeping and further processing. The raw data were collected and cleaned of superfluous information, such as commercials and images. It should also be noted that the Tomb Raider-based corpus contains only one type of text, thus ensuring homogeneity of the corpus. As McEnery & Hardie (2012:2) emphasize “the degree of homogeneity of a corpus is then another factor in determining how well matched that corpus is to particular research questions”.

Another important characteristic of any corpus is its size. The actual size of the Tomb Raider-based corpus is 230,000 words, which does not compare to the size of existing corpora. However, the advantage of this small-size corpus is that it contains a particular sample of texts which target Tomb Raider players’ community, thus being appropriate for the research questions. The corpus metadata includes author, website, creation date, and size. Although the Tomb Raider corpus is a comparatively small database, it still has the potential to conduct an exploratory research in the field, providing the representative compilation of texts along with popular retrieval methods and software tools which assist answering the research questions.

The following step of corpus compilation is annotation. This stage is characterized by encoding of metadata, textual markup or linguistic information (McEnery &Hardie 2012:29). This stage was skipped since certain contemporary retrieval software tools can support untagged texts of a corpus. In addition, McEnery & Hardie (2012:33) note that "corpus search tools have over the years developed to become very user-friendly. By contrast, corpus annotation programs – while widely available – typically require so much advanced computer expertise to install and use that they are, effectively, not accessible to most linguists".

The final stage of corpus compilation is associated with retrieval tools and search methods, among which the well-known ones in linguistics are the concordance method, frequency lists, keywords, n-grams, and collocations (Rayson 2015:40-41). Since the present research is focused on the use of geographical, cultural, archeological and historical terms by Tomb Raider players, the most appropriate retrieval method will be the analysis of frequency lists.

At the same time, Rayson (2015: 41) alerts that "different software tools […] produce slightly different frequency information and word counts for the same corpus data due to the way words are defined and delimited, e.g. whether punctuation is counted, capitalization is significant, and contractions are counted as one item or two". In this relation, taking into account the abovementioned account, the choice of the retrieval software tool is placed on AntWordProfiler, which allows different approaches to the word analysis.

As such, this software offers two search tools. According to the AntWordProfiler manual, the Vocabulary Profile Tool ensures lexical analysis of corpus texts comparing them to vocabulary frequency levels created by Paul Nation, while the File Viewer and Editor Tool allows uploading a file and marks the words of a text into colors corresponding to vocabulary levels. Additionally, this tool allows editing of a text and highlights the level-list words as well as words which do not fall into three frequency lists, simultaneously providing basic percentage statistics of each frequency level (Anthony 2021).

Drawing on the functionality of AntWordProfiler the list of cultural, archeological, geographical and historical terms used in the Tomb Raider walkthroughs can be selected for the next stage of the research, the construction of the Yes/No vocabulary test. It is important to stress that given the rare use of certain cultural, archeological, geographical and historical terms, they might not feature in the frequency lists, and therefore they should be selected from the non-level list of words in accordance with their importance for completion of the game.

6. 2. The Yes/No vocabulary test

Over the last decades, the Yes/No vocabulary test gained popularity in the field of vocabulary research owing to the simplicity of its format. The conventional Yes/No vocabulary test aims at measuring learners' receptive vocabulary size through word recognition (Eyckmans 2004:18). Usually test takers are addressed with a list of words belonging to different frequency levels in the target language, which have to be ticked "yes" if the meaning of a word is known (Eyckmans 2004:18). Previously, Meara & Buxton (1987:150) stressed the importance of the Yes/No test which "makes it possible to come up with a figure which actually quantifies the number of words a student knows". Additionally, according to Meara & Buxton (1987: 146,150), the Yes/No test is not difficult to construct and can contain the list of several hundred items to check in a limited amount of time.

It should be stressed that the Yes/No format which originated from the checklist format and was initially developed for the measurement of vocabulary size of native English learners, was also successfully implemented in L2 research (Eyckmans 2004:19). As such, in the 1980s Meara & Buxton (1987:145-147) designed a Yes/No test providing a list of 60 real French words and 40 pseudowords and employed a scoring methodology in accordance with the formula based on the measurement of the proportion of real words and the rate of imaginary words. A year later, Meara & Jones (1988:81) developed a Eurocentres Yes/No test which was totally automated. In further research, the Yes/No technique has been applied to languages other than English which resulted in a series of tests developed for the major European languages. Furthermore, it has become available in the digital format through the EU's Dialang project (Meara & Miralpeix 2017:115).

Traditionally, the Yes/No test methodology is based on a list of both real words which are selected from frequency levels and might be known by learners and imaginary words or pseudowords which do not exist in the vocabulary (Meara & Buxton 1987:145). The strategy to add pseudowords to the list was introduced by Anderson and Freebody (1981:109) in their research on vocabulary size of native English learners in the early 1980s. The approach based on the Signal Detection Theory aimed at "eliminating variation in the degree of confidence different individuals must have before they are willing to say, "Yes, I know that word"" (Anderson & Freebody 1981:108).

According to Eyckmans (2004:27) the Yes/No test designed by Anderson and Freebody contained pseudowords which were constructed by means of : 1) altering one or two letters in an existent word (e.g. "flirt" becomes "flort"); and 2) creating pseudoderivatives by means of attaching affixes to unconventional bases, for instance "observement", "adjustion". Since the initial recommendations for the formation of the pseudowords were not clear, it has been agreed in the academic milieu that pseudowords must correspond to the rules of phonetics and morphology in the target language (Eyckmans 2004:27).

It should be noted that certain problems arise when it comes to calculating the scores in the Yes/No test. From Eyckmans's (2004:28) point of view "the critical problem is how to get a precise estimate of vocabulary knowledge separate from the tendency to over- or underestimate this knowledge". In 1988 Meara & Johns (1988:82) claimed that "the size of the adjustment depends on the number of correct responses to imaginary words". Although several formulae have been developed over time to measure the scores in the Yes/No test, the core principle lies in adjusting the scores in accordance with the rate of false alarms (Eyckmans 2004:28). In other words, ticking "yes" to the pseudowords adjusts the score in the test downwards, thus avoiding inflated estimates of vocabulary size (Eyckmans 2004:19).

Given the nature of the test, where two types of items and two possible responses are crucial parameters of calculating the test score, four combinations of results have been compiled in the item-response matrix of the Yes/No test (Beeckmans et al. 2001:237). For the graphical visualization of the item-response matrix see Figure 4. According to the matrix, four response

alternatives are possible, such as 1) hit or saying “yes” to a real word; 2) false alarm or saying “yes” to a pseudoword; 3) miss or saying “no” to a real word; 4) correct rejection or saying “no” to a pseudoword (Beeckmans et al. 2001:237). As Beeckmans et al. (2001:238) stress the simplest approach of measuring only the rate of correct responses was never considered as a scoring method. Instead, the false alarm rate has always been employed as a formula to avoid overestimation of vocabulary knowledge where high false-alarm rates resulted in a lower test score (Beeckmans et al. 2001: 238).

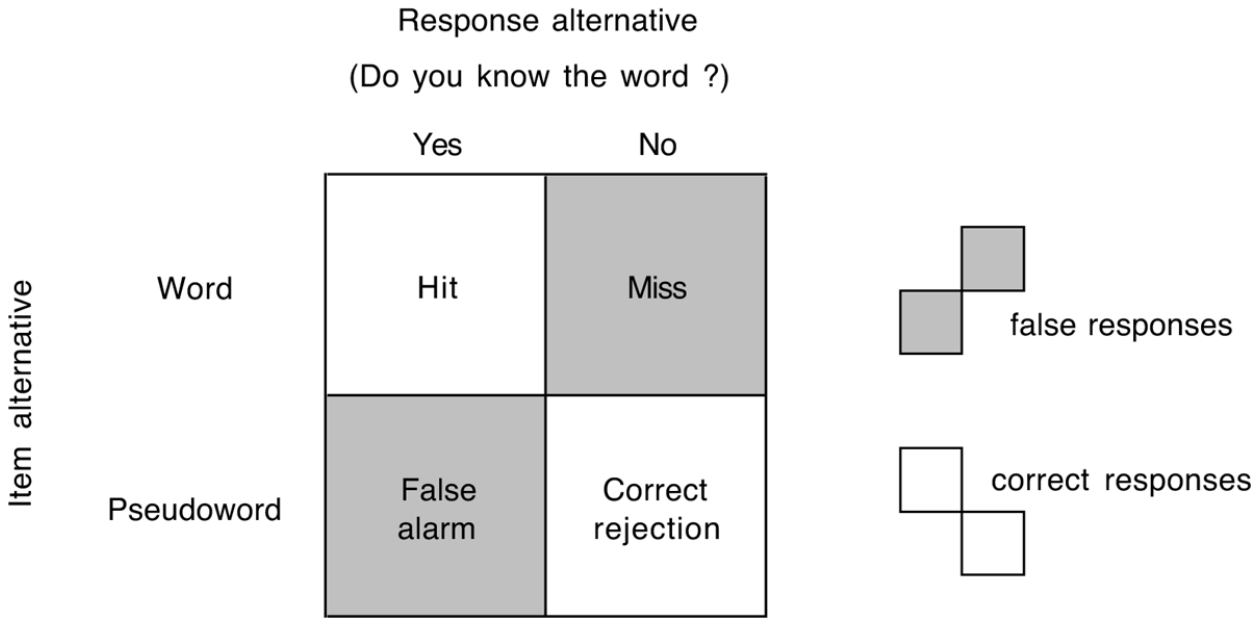

Figure 4: The item-response matrix of the Yes/No vocabulary test

Furthermore, Huibregtse & Admiraal (2002:230) single out other factors which might have an impact on learners’ choices in the Yes/No test, namely sophisticated guessing, which is expressed in the situations when test takers are not sure of the exact meaning of a word and have an opportunity to guess; and individual response style on both pseudowords and real words (Huibregtse & Admiraal 2002:230). Therefore, calculating methods in the Yes/No test have been worked out taking into account 1) four response alternatives; 2) possibility of sophisticated guessing; and 3) test takers response styles (Huibregtse & Admiraal 2002:230).

In this respect, Mochida & Harrington (2006:76) proposed the overview of the four scoring formulae for the Yes/No vocabulary test. The recent calculating method was developed by Meara & Miralpeix (2017:120 as included in Schwarz 2020:173). As such, the scoring formulae for the Yes/No vocabulary test are:

1) Number of correct responses
$h - f$ (where *h* stands for hits rate and *f* indicates false alarms rate);

2) Correction for guessing (*cfg*) by Anderson & Freebody (1983) where *P(h)* is true hit rate, *h* stands for observed hit rate and *f* is false alarm rate:

$$P\,(h) = \frac{(h)-(f)}{1-(f)}$$

3) Meara's Δm

$$\Delta m = \frac{(h-f)}{(1-f)} - \frac{f}{h}$$

4) Index of Signal Detection (*ISDT*) by Huibregtse, Admiraal & Meara (2002:238)

$$ISDT = 1 - \frac{4h(1-f)-2(h-f)(1+h-f)}{4h(1-f)-(h-f)(1+h-f)}$$

5) S-shaped logistic weighting function by Meara & Miralpeix (2017:120 as included in Schwarz 2020:173) where *w(h)* and *w(f)* refer to the weighted values of the hit and false alarm rate:

$$Vsize = \sum (hs*100*(1- \frac{wfs}{whs}))$$

Taking into account all the mathematical algorithms, from the simplest ones to the most sophisticated "engineering solution" for the computerized V_YesNo test on the Lognostics Tools website (Meara & Miralpeix 2017:116-120), it becomes obvious that the selection of the right calculating method can pose certain problems for test administrators.

For example, a simple count of correct answers will not yield correct scoring because the hits and the correct rejections to pseudowords are different types of responses, thus cannot be considered equivalent (Huibregtse, Admiraal & Meara 2002:231). Furthermore, the second formula, the number of correct responses, which measures the rate of hits minus the false alarm rate *h-f* , also does not bring an adequate score when the false alarm rate is low (Mochida & Harrington 2006:76). According to Huibregtse, Admiraal & Meara (2002:231) this formula can be employed if test takers change their response behavior and have a proportion of false alarms larger than 0.

The correction for guessing approach is rooted in the "blind guessing model" which presupposes that a test taker either knows a word or guesses it at random (Huibregtse, Admiraal & Meara 2002:232). As a disadvantage, this measurement does not take into account response style of respondents, sophisticated guessing or different degrees of knowing a word and the false alarms proportion which does not allow discrimination between the scores of participants if they answer all "yes" or all "no" to pseudowords (Huibregtse, Admiraal & Meara 2002:232-233).

Having analyzed all the above mentioned shortcomings of the correction for guessing approach, the improved alternative for the blind guessing model, which considered opportunities for sophisticated guessing, was worked out by Meara in 1992 (Huibregtse, Admiraal & Meara 2002:233-237). However, as Huibregtse, Admiraal & Meara (2002:237) point out that the result of Meara's formula of Δm "resembles the effect of the blind guessing model and does not correct for individual response style in an adequate way; in the most cases, such as correction of the score will result in an underestimation of the true score".

Since the abovementioned formulae did not consider the response style variable in scoring, a different methodology based on the proportion of hits and false alarms and the effect of sophisticated guessing was developed (Huibregtse, Admiraal & Meara 2002:237). The Index of Signal Detection (ISDT) allows measuring "the hit rate that would have been scored if the participants' response style had been perfectly unbiased" (Huibregtse, Admiraal & Meara 2002:238).

Lately, the scoring algorithm for the computerized V_YesNo test was developed for the Lognostics Tools website (Meara & Miralpeix 2017:116-120). Meara & Miralpeix (2017: 120) provide the account of the new methodology as follows:

> This formula generates an S-shaped logistic weighting function that penalises incorrect YES answers differentially, depending on how many correct YES answers a testee produces. For example, if the number of Hits = 4 and the number of FAs = 1, then a relatively large correction is applied. If the number of Hits = 10 and the number of FAs = 1, then a much smaller correction is applied.

Given the variety of measuring methods, the choice of the right adjustment formula might become a challenging procedure. Having compared the alternative measuring formulae in the study on the performance in the Yes/No test as a predictor of subsequent Vocabulary Levels Test score, Mochida & Harrington (2006:91) conclude that the methods "yielded only small differences in outcomes". In addition, Mochida & Harrington (2006:91-92) stress that the results of the simple *h - f* correct responses formula coincide with the scores of the more sophisticated *cfg* and *ISDT* methods.

Moreover, the conclusions of Mochida & Harrington's study accord with the findings revealed in the previous research conducted by Huibregtse, Admiraal & Meara (2002:238-240). A comparison of four methods, namely (*h - f, cfg,* Δm, and *ISDT*), indicates that "the measure Δm always yields an underestimation of the intended standard, whereas correction for guessing gives an overestimation for large hit proportions" (Huibregtse, Admiraal & Meara 2002:238-240). Furthermore, Huibregtse, Admiraal & Meara (2002: 240) point out that the scores adjusted by the simple formula *h - f* are in most cases exactly the same as the scores measured according to the Index of Signal Detection (*ISDT*).

Additionally, Huibregtse, Admiraal & Meara (2002: 240) sum up that "an advantage of *h - f* is that it is easy to calculate the index and to explain the procedure. In practice, the exceptions for which *h - f* and the new index give different results are not very common. For this reason, it is possible to argue on empirical grounds that *h - f* is a practical measure in, for example, the context of small-scale applications of the yes/no test in education".

It should be underlined that in order to ensure adequate calculation of the scores on the Yes/No test, it is important to obtain reliable responses from test takers who have to get clear instructions on the test prior to the procedure. As Schwarz (2020:153) reasonably notes the exact wording of the test instruction can influence the choices of test takers and their performance on the Yes/No test. Moreover, Schwarz (2020:153-154) continues that there is the general agreement to inform test takers about pseudowords and provide them with detailed instructions. For instance, Meara & Miralpeix (2017:116-117) suggest the following guidelines:

> We usually find it helpful to emphasize to test takers that they should say YES only if they know the meaning of the target word: familiarity with a word form is not enough. We usually tell them that the test is not timed, and there is no advantage in doing the test as quickly as they can. Nevertheless, if they find themselves hesitating over a word, having to think about whether they know its meaning or not, then they should answer NO. […] Guessing is best avoided as saying YES to pseudo-words negatively affects the final score. Experience suggests that the test works better if the test takers are told that some of the words are not real words, and that they should not answer YES to items they do not know.

Therefore, taking into account all the above mentioned accounts on the construction and administration of the Yes/No vocabulary test, it has been decided to construct the Yes/No vocabulary test based on the Tomb Raider lexis represented by the geographical, archeological, historical and cultural terms. These words do not belong to the vocabulary frequency levels as administered by the AntWordProfiler software but fall in the category of the vocabulary level 0 which is indicative of a rare use of these words.

Since there is no general consensus on the proportion and number of real words and pseudowords, it has been decided to construct the Yes/No test which emulates the design of the test proposed by Meara & Buxton (1987:146). The Yes/No test in the present study consists of 100 items which are represented by 60 real words selected from the Tomb Raider corpus and 40 pseudowords coined according to phonological and morphological principles of the English language. All the words are divided into four blocks containing 15 real words and 10 pseudowords each. Given the small-scale of the test, the choice of a formula out of a variety of the calculating methodologies is placed on the $h - f$ formula of correct responses.

Also, the Yes/No test provides the guidelines which instruct test takers to tick “yes” if they know the meaning of a word and “no” if the meaning of a word is unknown. Furthermore, participants are informed about availability of non-existent words in the test and deduction of points in case the answer “yes” is given to a pseudoword. The Yes/No test is integrated into the online questionnaire for the possibility of pilot study and further research.

6.3. The Tomb Raider questionnaire

The construction of the questionnaire is the final methodological stage of the present research design. According to Dörnyei (2010:1) questionnaires are the most frequently used instruments of data collection given their functionality to organize responses to questions in a systematic fashion. Furthermore, Dörnyei (2010:6) notes that the main advantages of questionnaires lie in the fact that they are easy and fast to construct due to computer software. Moreover, being designed in the digital format and distributed online, questionnaires can reach a broader audience by a simple click on web links, thus collecting huge amount of information from around the world in limited time.

Despite the abovementioned strengths, questionnaires have certain weaknesses which should be taken into account. For instance, Schwarz (2020:140) singles out the following downsides of questionnaire processing, namely “the impossibility of remedying missing data and mistakes, problems of respondent understanding or reliability, several bias effects and the relative superficiality of the data”. Therefore, keeping in mind all specifics of questionnaire design and administration, it has been decided to construct a questionnaire which aims at targeting an audience of Tomb Raider players through contacting them on the Tomb Raider websites, forums, and Facebook pages.

Since questionnaires are widely used data gathering instruments in L2 research, Dornyei’s (2010) seminal work was consulted with regard to such aspects of questionnaire construct as wording of items, response and scales structures, and item sequence. Moreover, the present

questionnaire attempts to follow the construct of the Extramural English Questionnaire which was designed by Schwarz (2020:141) for her research on Extramural English.

As such, Schwarz (2020:141) stresses that the Extramural English Questionnaire (EEQ) aims at collecting information in three main domains: the Extramural English activities, language background and sociodemographic data of participants. According to Schwarz (2020:141) the design of the Extramural English Questionnaire (EEQ) should incorporate three main parts, such as "1) participants' use of extramural English, 2) independent language variables, and 3) independent sociodemographic variables".

Schwarz (2020:141) suggests the list of independent language variables as follows: respondents' linguistic background and language proficiency, their opinions on English and vocabulary learning approaches they employ. Among the sociodemographic variables Schwarz (2020:141) singles out gender, age, the socioeconomic status, access to media and its use during leisure activities as the main ones, suggesting motivation, learning strategies and language skills as additional variables.

Therefore, following the construct of the Extramural English Questionnaire (EEQ), the Tomb Raider EE questionnaire has been designed to elicit information on Tomb Raider players' preferences with regard to duration of gameplay and use of Extramural English during and after gameplay practices. Given the narrow topic of the research and the selected target audience, the final version of the questionnaire has been limited to three thematic sections preceded with the brief introduction outlining the goal and guidelines to the questionnaire. (See Appendix A for the full questionnaire).

The first thematic section consists of 19 items. Respondents are addressed with 1) the questions on the frequency of playing Tomb Raider in English and during a week; and 2) the questions on their English practices during and after gameplay. Since it is important to collect the data which can be suited for the statistical analysis, the questionnaire items were designed as follows: 1) seventeen items imply responses rated according to the Likert scale and 2) two items in the

section are open-ended questions, asking participants to write down three words that they learned while playing Tomb Raider in English.

The questions on the playing habits of Tomb Raider gamers have been structured according to The Gaming Involvement and Informal Learning (GIIL) framework *(*Iacovides et al. 2014:611-626), thus outlining different means of interaction and informal English learning during and after gameplay. In addition, drawing on previous research in the field of digital gaming by Iakovides et al. (2012:324), the questions have been designed in a way which allows analysis of gameplay practices on micro and macro-involvement levels.

As such, participants are addressed with a number of questions regarding interaction during gameplay, namely whether they interact in oral or written chats, and a set of questions which are focused on 1) informal learning via paratexts, namely by means of reading game guides, commenting in game forums, watching game related streams, visiting game websites, and 2) informal learning via tangential sources, such as Wikipedia, YouTube videos, books, etc. Ultimately, participants are asked whether gaming is a useful tool of English learning.

The second section is the Yes/No test that is integrated into the questionnaire. Respondents have to tick "yes" (☒ Yes) if they know the meaning of a word and "no" (☒ No) if the meaning of the word is unknown to them. As explained above, the test consists of four sections containing a list of 25 words each. Given the format of the Yes/No test, each list includes 15 real and 10 pseudowords. The guidelines to the Yes/No test are provided at the beginning of the section informing participants of the specifics of the test.

The final section of the questionnaire, *General Background*, outlines sociodemographic, linguistic and educational background of respondents, namely their 1) age, 2) gender, 3) native languages, 4) languages spoken at home, 5) languages spoken with friends, 6) languages spoken at work /university, 7) duration of English language learning, 8) language proficiency and 9) game involvement level. As such, the Tomb Raider questionnaire collects information not only on the use of Extramural English during or after gaming but also on independent language and demographic variables.

As a further step, the Tomb Raider questionnaire was piloted among the Tomb Raider players to get their feedback and decide on the final version of the questionnaire. As a follow-up, certain questions were paraphrased and the additional questions on the attitude of players to learning from digital gaming were included in the questionnaire.

7. Data analysis and results

The present chapter illustrates the quantitative results on the relationship between game micro- and macro-level activities and the performance in the Yes/No vocabulary test. The empirical findings on practices occurring on two levels of game involvement will be outlined at large. Additionally, the general information on the sample group will be provided based on the statistical measurements of the demographic data as well as educational and language background of the participants.

The calculations of the Yes/No vocabulary test are performed according to the methodology which was discussed in the previous chapter. The statistical measurements are carried out with the help of IBM SPSS statistical software. The scale reliability analysis was carried out in SPSS to measure the consistency of the questionnaire construct. The value of Cronbach's Alpha ($\alpha = 0.8$) indicates a good reliability of the scale (Field 2018:1050).

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.800	.820	17

Table 1: Cronbach's alpha analysis

7.1. Overview of the sample

7.1.1. Background information on participants

The participants of the study are the Tomb Raider players who were recruited through the friends' circle and in the Facebook Tomb Raider and Lara Croft fan groups. The participants are non-native English speakers and belong to one sample group reaching in total 27 players (N=27), including 21 male and 6 female participants.

What is your gender?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	male	21	77.8	77.8	77.8
	female	6	22.2	22.2	100.0
	Total	27	100.0	100.0	

Table 2: Frequency distribution of gender variable

The average age of the sample group is 27.78 years (*M*=27.78, *N*=27, *SD* = 8.3, *range* = 32) with the age categories from 18 to 50 years old (see Appendix B Table B.1).

Descriptive Statistics

	N	Range	Sum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
How old are you?	27	32	750	27.78	8.327	.738	.448	.229	.872
Valid N (listwise)	27								

Table 3: Descriptive statistics of age variable

The linguistic background of the sample group displays multilingual diversity. For instance, among 27 respondents there are native speakers of Arabic (8 players), French (1), German (3), French/German (1), Italian (3), Polish (7), Spanish (2), and Ukrainian (2) (see Appendix B Table B.2). The tendency to use English in the communication with friends and at work or at the university is demonstrated in the frequency tables (see Appendix B Table B.3 and Table B.4). As such, 19 respondents speak English with their friends as well as 18 players employ English along with Arabic, French, German, Italian, Polish and Spanish at their workplace or at the university (see Appendix B Table B.3 and Table B.4).

The educational background in English is an important variable for description of the present sample group. Since the Tomb Raider players are asked to complete a Yes/No vocabulary test in English, it is worth knowing their language proficiency level. As such, respondents were addressed with the questions on the duration of English learning and the evaluation of their English proficiency level. The average duration of English learning by the group is 13.88 years (*N*=26, *M* =13.88, *SD* = 4.6, *range* = 18) with a range from 7 to 25 years of study (see Appendix B Table B.5).

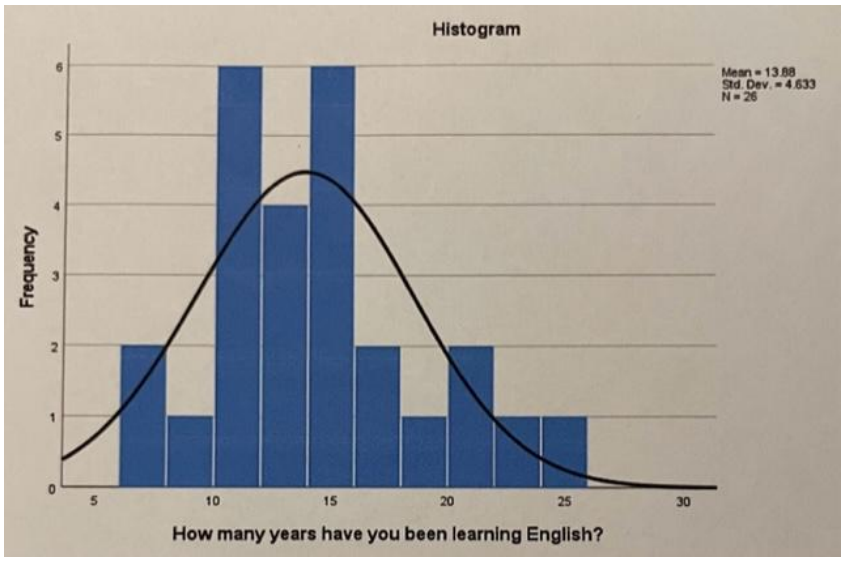

Figure 5: Histogram of the variable duration of English learning

Furthermore, the responses on the English language proficiency have been clustered into three categories, namely intermediate 40.7% (11 respondents), upper-intermediate 37% (10 respondents) and advanced 22.2% (6 respondents). The measures of central tendency suggest that the average English proficiency level of the sample group is upper-intermediate (N = 27, SD = 0.78, *Mode* = 3, *Mdn* = 4) (see Appendix B Table B.6).

How would you rate your English level?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	intermediate	11	40.7	40.7	40.7
	upper-intermediate	10	37.0	37.0	77.8
	advanced	6	22.2	22.2	100.0
	Total	27	100.0	100.0	

Table 4: Frequency distribution of the variable English proficiency level

7.1.2. Gameplay frequency of the sample group

In order to find out how much time the Tomb Raider players spend playing in English, they were addressed with two questions 1) *How often do you play Tomb Raider in English?* and *2) How many hours do you play Tomb Raider in English per week?.* The statistical calculations (N=27, *Mdn* = 3, *Mode* = 3, SD = 1.3, *range* = 4) (see Appendix B Table B.8) indicate that 33.3% of

respondents play Tomb Raider in English a few days a month, 25.9 % of respondents do so a few days a year, 18.5 % play it daily, 14.8% of players never play Tomb Raider in English and 7.4% play Tomb Raider in English some days weekly. According to the measures of central tendency, on average the sample group spends a few days a month playing Tomb Raider in English.

How often do you play Tomb Raider in English?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	4	14.8	14.8	14.8
	a few days a year	7	25.9	25.9	40.7
	a few days a month	9	33.3	33.3	74.1
	some days weekly	2	7.4	7.4	81.5
	daily	5	18.5	18.5	100.0
	Total	27	100.0	100.0	

Table 5: Frequency distribution of Tomb Raider gameplay in English per year

Furthermore, the weekly gameplay frequency was measured drawing on the responses to the question *How many hours do you play Tomb Raider in English per week?*. The statistical output (*N*=27, *Mdn* = 2, *Mode* = 2, *SD* = 1.1, *range* = 4) (see Appendix B Table B.9) indicates that 44.4 % of respondents spend up to 5 hours weekly, 22.2% of players spend 6-14 hours weekly, 14.8% of respondents never play weekly in English, 11.1% of participants play 22 hours and more weekly and only 7.4% of participants dedicate 15-21 hours weekly to Tomb Raider gameplay in English.

How many hours do you play Tomb Raider in English per week?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	4	14.8	14.8	14.8
	up to 5 hours	12	44.4	44.4	59.3
	6-14 hours	6	22.2	22.2	81.5
	15-21 hours	2	7.4	7.4	88.9
	22 hours and more	3	11.1	11.1	100.0
	Total	27	100.0	100.0	

Table 6: Frequency distribution of Tomb Raider gameplay in English per week

In total, it can be summed up that 23 respondents out of 27 play Tomb Raider in English weekly dedicating different amount of time depending on their preference, and only 4 participants out of 27 never play Tomb Raider in English weekly. On average, the respondents spend up to 5 hours weekly playing the game in English.

In order to investigate how much respondents are involved in digital gaming, they were asked to rate their game involvement according to the following levels, *non-gamer, casual gamer, moderate gamer and hardcore gamer.* The statistical measurements (*N*=27, *Mdn* = 3, *Mode* = 2, *SD* = 0.6, *range* = 2) (see Appendix B Table B.7) illustrate that 25 respondents out of 27 (or 48.1% and 44.4% correspondingly) identify themselves as casual and moderate gamers, while only 2 participants (7.4%) describe themselves as hardcore gamers.

How would you rate your game involvement level?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	casual gamer	13	48.1	48.1	48.1
	moderate gamer	12	44.4	44.4	92.6
	hardcore gamer	2	7.4	7.4	100.0
	Total	27	100.0	100.0	

Table 7: Frequency distribution of game involvement

The crosstabulation table below illustrates that casual and moderate gamers usually spend many hours gaming in English, namely from up to 5 hours to over 22 hours weekly. One hardcore gamer out of 2 plays Tomb Raider in English more than 22 hours weekly. There are also four players who never play Tomb Raider in English weekly. In total, 12 players out of 27 spend up to 5 hours weekly on gaming, 6 players out of 27 play Tomb Raider 6-14 hours weekly, 1 player dedicates 15-21 hours to gaming and 4 players spend on gaming over 22 hours weekly.

How would you rate your game involvement level? * How many hours do you play Tomb Raider in English per week? Crosstabulation

Count

		How many hours do you play Tomb Raider in English per week?					
		never	up to 5 hours	6-14 hours	15-21 hours	22 hours and more	Total
How would you rate your game involvement level?	casual gamer	2	6	2	1	2	13
	moderate gamer	1	6	4	0	1	12
	hardcore gamer	1	0	0	0	1	2
Total		4	12	6	1	4	27

Table 8: Distribution of gameplay frequency per week across game involvement levels

It is interesting to note that the correlation test estimates (*CI* 95 [-0.4; 0.41], *N*=27, *p* = 0.964, r_S = 0.009) do not demonstrate the relationship between the duration of the gameplay in English per week and the players' game involvement, which means that players' identification as gamers is not dependent on the time they spend gaming in English.

Correlations

					How would you rate your game involvement level?	How many hours do you play Tomb Raider in English per week?
Spearman's rho	How would you rate your game involvement level?	Correlation Coefficient			1.000	.009
		Sig. (2-tailed)			.	.964
		N			27	27
		Bootstrap[c]	Bias		.000	.003
			Std. Error		.000	.219
			95% Confidence Interval	Lower	1.000	-.406
				Upper	1.000	.415
	How many hours do you play Tomb Raider in English per week?	Correlation Coefficient			.009	1.000
		Sig. (2-tailed)			.964	.
		N			27	27
		Bootstrap[c]	Bias		.003	.000
			Std. Error		.219	.000
			95% Confidence Interval	Lower	-.406	1.000
				Upper	.415	1.000

c. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Table 9: Correlation estimates of game involvement and gameplay frequency per week

7.1.3. Gaming activities on micro- and macro-levels of game involvement

The frequency of gaming practices belonging to both micro- and macro-levels of game involvement is of particular interest in the context of the present study. The micro-level practices which occur during the gameplay are usually enabled by the game online multiplayer mode. In this connection, to investigate the frequency of micro-level practices the participants have to respond to two questions 1) *How often do you interact with other people in English in a written chat during Tomb Raider gameplay?* and *2) How often do you interact with other people in a voice chat in English during Tomb Raider gameplay?*.

The statistical output for the written gameplay interaction (*N*=27, *Mdn* = 2, *Mode* = 1, *range* = 4) and the oral gameplay interaction (*N*=27, *Mdn* = 1, *Mode* = 1, *range* = 3) demonstrates that micro-level activities are rarely or never practiced by the majority of Tomb Raider players (also see Appendix B, Table B32).

Statistics

		How often do you interact with other people in English in a written chat during Tomb Raider gameplay?	How often do you interact with other people in a voice chat in English during Tomb Raider gameplay?
N	Valid	27	27
	Missing	0	0
Median		2.00	1.00
Mode		1	1
Std. Deviation		1.289	1.000
Skewness		.756	1.246
Std. Error of Skewness		.448	.448
Kurtosis		-.445	.271
Std. Error of Kurtosis		.872	.872
Range		4	3

Table 10: Measurements of central tendency of two micro-involvement activities

More precisely, 17 our 27 respondents, which corresponds to 63%, never interact in a voice chat in English, 14.8% of players rarely and 14.8% sometimes interact in a voice chat and only 7.4 % of respondents often communicate in a voice chat during the Tomb Raider gameplay.

How often do you interact with other people in a voice chat in English during Tomb Raider gameplay?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	17	63.0	63.0	63.0
	rarely	4	14.8	14.8	77.8
	sometimes	4	14.8	14.8	92.6
	often	2	7.4	7.4	100.0
	Total	27	100.0	100.0	

Table 11: Frequency distribution of oral interaction variable

The interaction in a written chat occurs rarely among 25.9 % of respondents, 18.5 % reported that they sometimes communicate in a written chat, 11.1% frequently and 7.4% quite frequently interact in a written form. Moreover, 37% of respondents or 10 players out of 27 never interact in a written chat in English (see Appendix B the crosstabulation Table B.10).

How often do you interact with other people in English in a written chat during Tomb Raider gameplay?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	10	37.0	37.0	37.0
	rarely	7	25.9	25.9	63.0
	sometimes	5	18.5	18.5	81.5
	often	3	11.1	11.1	92.6
	quite frequently	2	7.4	7.4	100.0
	Total	27	100.0	100.0	

Table 12: Frequency distribution of written interaction variable

Since the Tomb Raider players are rarely involved in the micro-level activities, these variables might have no relationship with the players' performance in the vocabulary test. Therefore, it is important to analyze the frequency of activities occurring after the gameplay or on the macro-level of game involvement.

The frequency measurements aim to single out the most frequent, the rarely or never practiced macro-involvement activities. For this analysis the measures of central tendency are used. As such, according to the descriptive statistics (N =27) illustrated in the table below (also see Appendix B, Table B.32), it can be concluded that the most frequent practices are watching Tomb Raider related video content in English (N =27, *Mdn* =5, *Mode* = 5), consulting external resources in English (N =27, *Mdn* =5, *Mode* = 5), reading news or updates regarding Tomb

Raider in English (*N* =27, *Mdn* =4, *Mode* = 5), reading walkthroughs or game guides in English (*N* =27, *Mdn* =4, *Mode* = 4).

Furthermore, based on the measures of the central tendency the less frequent activities among Tomb Raider players were indicated, such as, watching Tomb Raider based movies in English (*N* =27, *Mdn* =3, *Mode* = 5), visiting Tomb Raider forums, blogs and websites (*N* =27, *Mdn* =3, *Mode* = 3) and listening to Tomb Raider podcasts in English (*N* =27, *Mdn* =2, *Mode* = 2).

It should be noted that there are certain activities which are reported by the players as rarely practiced, such as contribution to forums, blogs or websites in English (*N* =27, *Mdn* =2, *Mode* = 1). Furthermore, according to the measures of central tendency, three activities, such as reading other people's Tomb Raider fan fiction in English (*N* =27, *Mdn* =1, *Mode* = 1), writing Tomb Raider fan fiction in English (*N* =27, *Mdn* =1, *Mode* = 1), cosplaying Lara Croft and Tomb Raider characters in English (*N* =27, *Mdn* =1, *Mode* = 1) are predominately never experienced by the Tomb Raider players.

Statistics

		How often do you interact with other people in English in a written chat during Tomb Raider gameplay?	How often do you interact with other people in a voice chat in English during Tomb Raider gameplay?	How often do you read Tomb Raider walkthroughs/ or guides in English?	How often do you watch Tomb Raider related video content (trailers, previews, etc.) in English?	How often do you visit Tomb Raider forums, blogs or websites in English?	How often do you contribute to Tomb Raider forums, blogs or websites in English?	How often do you read news or updates regarding the Tomb Raider franchise in English on the Internet?	How often do you read other people's Tomb Raider fan fiction in English?	How often do you write your own Tomb Raider related fan fiction in English?	How often do you watch Tomb Raider based movies in English?	How often do you listen to Tomb Raider related podcasts in English?	How often do you cosplay Lara Croft or other Tomb Raider characters referring to resources in English (apps, tutorials, websites, etc.)	How often do you consult external resources in English, such as Wikipedia, maps, YouTube, books, for additional information?
N	Valid	27	27	27	27	27	27	27	27	27	27	27	27	27
	Missing	0	0	0	0	0	0	0	0	0	0	0	0	0
Median		2.00	1.00	4.00	5.00	3.00	2.00	4.00	1.00	1.00	3.00	2.00	1.00	5.00
Mode		1	1	4	5	3	1[a]	5	1	1	5	2	1	5
Range		4	3	4	4	4	4	4	3	2	4	3	2	4
Percentiles	25	1.00	1.00	3.00	3.00	2.00	1.00	2.00	1.00	1.00	3.00	1.00	1.00	3.00
	50	2.00	1.00	4.00	5.00	3.00	2.00	4.00	1.00	1.00	3.00	2.00	1.00	5.00
	75	3.00	2.00	5.00	5.00	5.00	3.00	5.00	2.00	1.00	5.00	3.00	2.00	5.00

a. Multiple modes exist. The smallest value is shown

Table 13: Measurements of central tendency for micro- and macro-involvement activities

7.1.4. Scores in the Yes/No vocabulary test

The average result for the whole group of participants is calculated indicating the mean score of 0.31 (*CI* 95 [0.2; 0.4], *N* =27, *M* = 0.31, *Mdn = 3*, *SD* = 0.27, *range* = 0.97).

Descriptives

			Statistic	Std. Error
testscore	Mean		.3141	.05294
	95% Confidence Interval for Mean	Lower Bound	.2053	
		Upper Bound	.4229	
	5% Trimmed Mean		.3043	
	Median		.3000	
	Variance		.076	
	Std. Deviation		.27507	
	Minimum		-.07	
	Maximum		.90	
	Range		.97	
	Interquartile Range		.48	
	Skewness		.277	.448
	Kurtosis		-.819	.872

Table 14: Descriptive statistics of the variable test score

Since the test score is a dependant variable which will be used for further statistical analysis, it is important to explore its normal distribution. The scatterplot and the histogram below illustrate the distribution of the data. The inspection of the scatterplot indicates close linear relationship of the data points and only slight deviation from the diagonal line. Also, the histogram demonstrates the near-normal distribution with the estimates of the skewness (S = 0.277) and the kurtosis (K = - 0.81), which are not significantly different from 0 (Field 2018:343).

In addition, the calculation of the Kolmogorov-Smirnov test of normality (D (27) = 0.107, p = 0.2) brings estimates which are not significant, hence it indicates not significant deviation from the normality (Field 2018:350-353). Since the mean parameter of the dependant variable is not significantly affected by the extreme scores or the non-normal distribution, it is expected that further estimates will be statistically powerful.

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
testscore	.107	27	.200*	.953	27	.256

Table 15: Estimates of the Kolmogorov - Smirnov test of normality

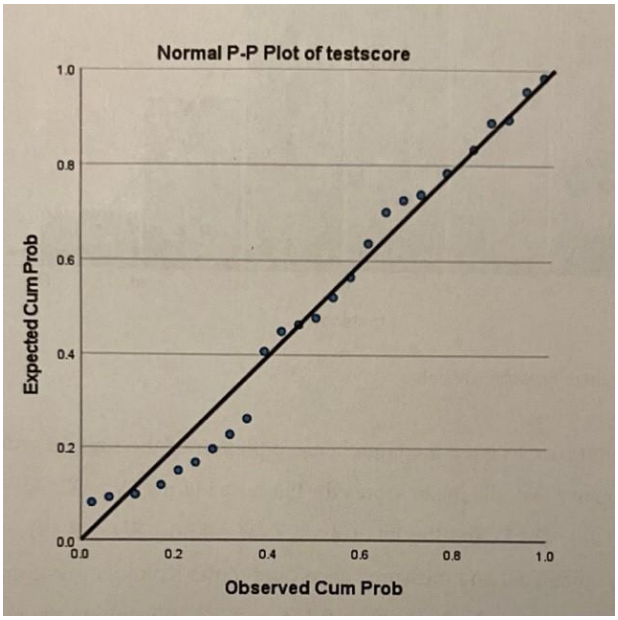

Figure 6: Scatterplot of testscore variable

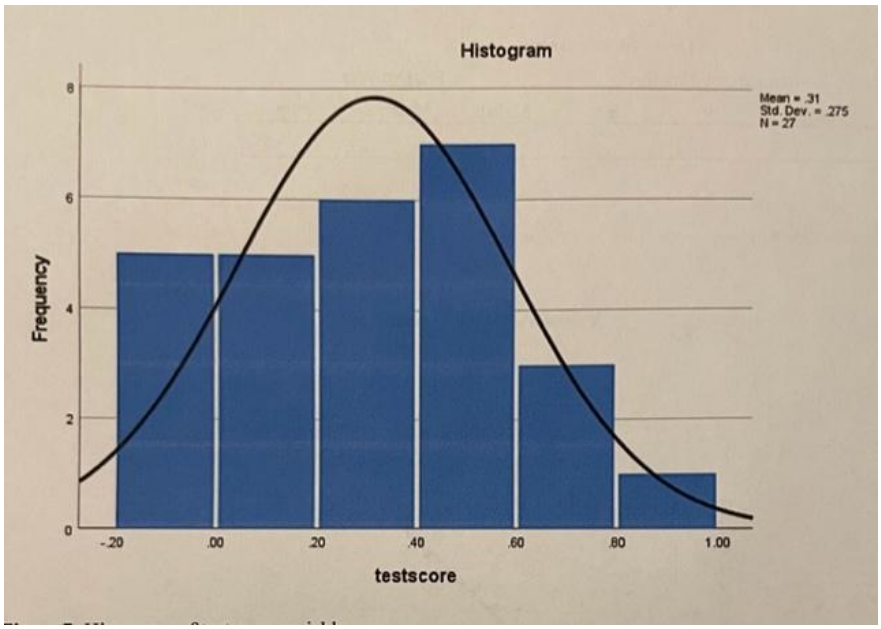

Figure 7: Histogram of testscore variable

Furthermore, in order to have a comprehensive picture of the sample group performance in the Yes/No vocabulary test, the mean scores for the false alarms (N = 27, M =15.6, SD = 9.90) (see Appendix B Table B.11) and the hits (N = 27, M =42.6, SD = 8.89) (see Appendix B Table B.12) are also calculated and measured according to the Kolmogorov- Smirnov test of normality (1) D (27) = 0.124, p = 0.2, 2) D (27) = 0.136, p = 0.2) illustrating the near-normal distribution of these two variables (see Appendix B for the normality tests Table B.13 and Table B.14).Two histograms below illustrate the frequency distribution of hits and false alarms.

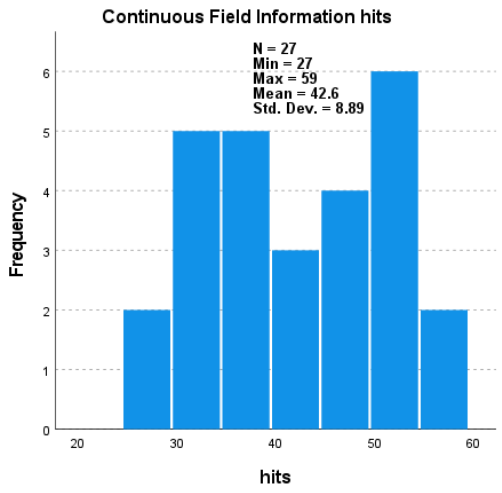

Figure 8: Descriptive statistics of hits variable

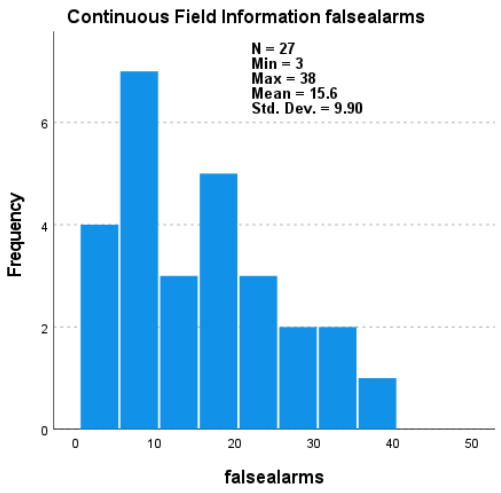

Figure 9: Descriptive statistics of false alarms variable

7.1.5. Players attitude to digital gaming and vocabulary learning through digital gaming

Aside from the sets of questions on the gaming practices as well as demographic, educational and linguistic background, the participants are addressed with questions which aim at shedding light on their attitude to digital gaming and learning from digital gaming. As such, the participants are approached with two questions, namely 1) *Do you think that all you have learnt from Tomb Raider is how to play it?* and 2) *How much do you think Tomb Raider helped you to expand your English vocabulary?*. According to the statistical measurements (*N* = 27, *Mdn =2*, *Mode =1*) (see Appendix B Table B.15) 74% of respondents (40.7% and 33.3% correspondingly) report that they strongly disagree and disagree that all they learn from digital gaming is only how to play the games.

Do you think that all you have learnt from Tomb Raider is how to play it?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	strongly disagree	11	40.7	40.7	40.7
	disagree	9	33.3	33.3	74.1
	neither	3	11.1	11.1	85.2
	agree	2	7.4	7.4	92.6
	strongly agree	2	7.4	7.4	100.0
	Total	27	100.0	100.0	

Table 16: Frequency distribution of attitude responses on learning through gaming

According to the answers of respondents, a word cloud has been created to illustrate a variety of experiences that the Tomb Raider players learn through digital gaming, including puzzle solving, strategic thinking, English, reflexes, coordination, planning and learning to name a few.

Figure 10: Skills and concepts learnt through gaming

Furthermore, 48.1% of players answered that Tomb Raider helped them *a lot* or *immensely* to expand English vocabulary. Also, 44.4% of participants mentioned *some help* in terms of vocabulary growth through playing Tomb Raider, while only 3.7% mentioned *no help* or *a little*

help of Tomb Raider for vocabulary development. According to the estimates (*N* = 27, *Mdn* =*3*, *Mode* =*3*) on average respondents acknowledge some help from gaming in relation to English vocabulary development (see Appendix B Table B.16).

How much do you think Tomb Raider helped you to expand your English vocabulary?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	not at all	1	3.7	3.7	3.7
	a little	1	3.7	3.7	7.4
	some help	12	44.4	44.4	51.9
	a lot	8	29.6	29.6	81.5
	immensely	5	18.5	18.5	100.0
	Total	27	100.0	100.0	

Table 17: Frequency distribution of attitude responses on expansion of English vocabulary through playing Tomb Raider

According to the crosstabulation measurements, 6 casual gamers, 6 moderate gamers and 1hardcore gamer agree that digital gaming helps them *a lot* and *immensely* to expand English vocabulary (see Appendix B Table B.17). The bar chart below illustrates the distribution of responses on vocabulary growth through playing Tomb Raider across three groups of gamers.

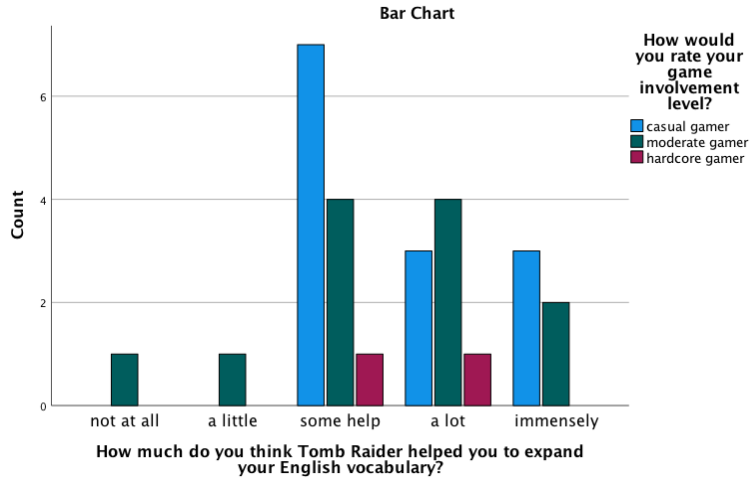

Figure 11: Frequency distribution of attitude responses on expansion of English vocabulary across game involvement levels

Some help was reported by 7 casual gamers, 4 moderate gamers and 1 hardcore gamer, while for 2 moderate gamers digital gaming is not a source of English vocabulary learning. In sum, 12 participants reported *some help*, while 13 respondents answered *a lot* and *immensely* to the question on the digital gaming as a source of English vocabulary growth.

Additionally, the Tomb Raider players are requested to mention three words that they learned through playing Tomb Raider. The word cloud illustrates the set of words, predominantly nouns and adjectives, which have been reported by the players as acquired through gaming.

Figure 12: Words learnt through playing Tomb Raider

7.2. Research questions

7.2.1. What is the gender frequency distribution across the Tomb Raider players?

The calculation of the gender frequencies indicate that out of 27 respondents there are 77.8% male and 22.2% female respondents, which corresponds to 21 male and 6 female Tomb Raider players (see Table). The measurements of the gender distribution across four levels of game involvement demonstrate that female players identify themselves as casual (4 female players) and moderate (2 female respondents) gamers, while male players associate themselves with hardcore (2 responses), moderate (10 responses) and casual (9 responses) gamers.

How would you rate your game involvement level? * What is your gender? Crosstabulation

Count

		What is your gender?		
		male	female	Total
How would you rate your game involvement level?	casual gamer	9	4	13
	moderate gamer	10	2	12
	hardcore gamer	2	0	2
Total		21	6	27

Table 18: Frequency distribution of game involvement across gender

Furthermore, the estimates of game frequency per week indicates that both male and female players dedicate to gaming up to 5 hours (10 male and 2 female players), 6-14 hours (3 respondents per each group), 14-21 hours (1 female player) and over 22 hours (4 male players). It should be noted that all female respondents play Tomb Raider in English weekly, even though their game frequency varies, while among male respondents there are 4 male players who never play Tomb Raider in English.

How many hours do you play Tomb Raider in English per week? * What is your gender? Crosstabulation

Count

		What is your gender?		
		male	female	Total
How many hours do you play Tomb Raider in English per week?	never	4	0	4
	up to 5 hours	10	2	12
	6-14 hours	3	3	6
	15-21 hours	0	1	1
	22 hours and more	4	0	4
Total		21	6	27

Table 19: Gameplay frequency per week across gender

The gender distribution across the language proficiency levels is represented by intermediate (8 male and 3 female players), upper-intermediate (8 male and 2 female players), and advanced (5 male and 1 female players) levels of English knowledge for both gender groups.

How would you rate your English level? * What is your gender? Crosstabulation

Count

		What is your gender?		
		male	female	Total
How would you rate your English level?	intermediate	8	3	11
	upper-intermediate	8	2	10
	advanced	5	1	6
Total		21	6	27

Table 20: Frequency of English language proficiency across gender

It is interesting to note that the analysis of the Yes/No vocabulary test scores displays the tendency that female test-takers performed better than male participants with the scores ranging 0.36-0.9 for female and -0.07-0.78 for male participants and the mean score of 0.31 for the sample. Also, the number of false alarms is lower among female test takers (from 3 to 13) and significantly higher among male respondents (from 4 to 38), while the range of hits is 31-59 out of 60 for female participants and 27-56 out of 60 for male test takers (see bar charts below).

However, it should be noted that the number of female respondents is quite limited and thus a gender subgroup within the same sample group cannot be singled out. Therefore, the estimates based on the gender variable are related only to the group of 27 players and cannot go beyond this sample and be generalized.

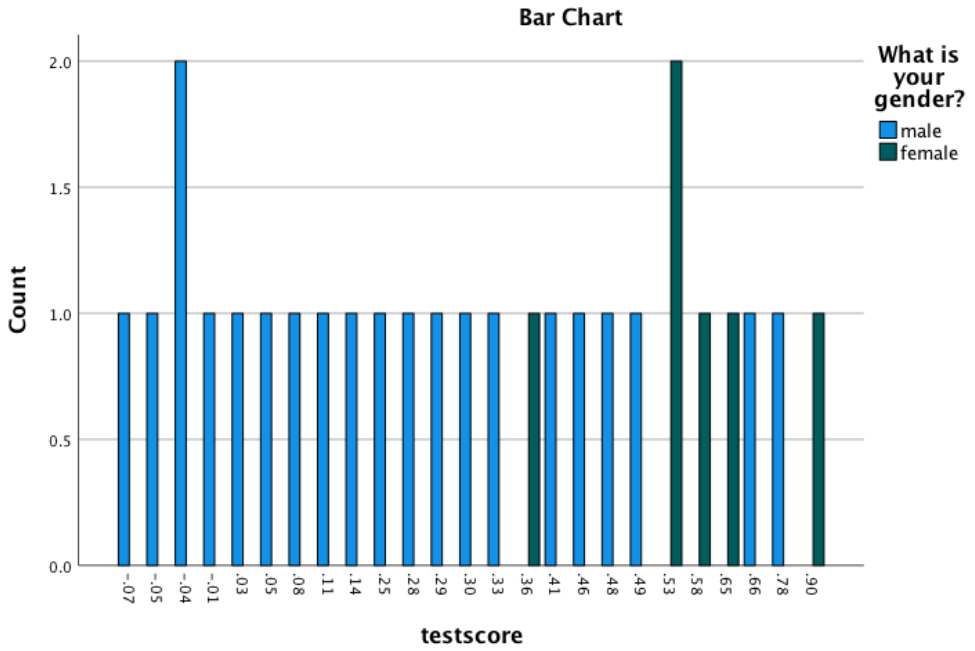

Figure 13: Test scores across gender

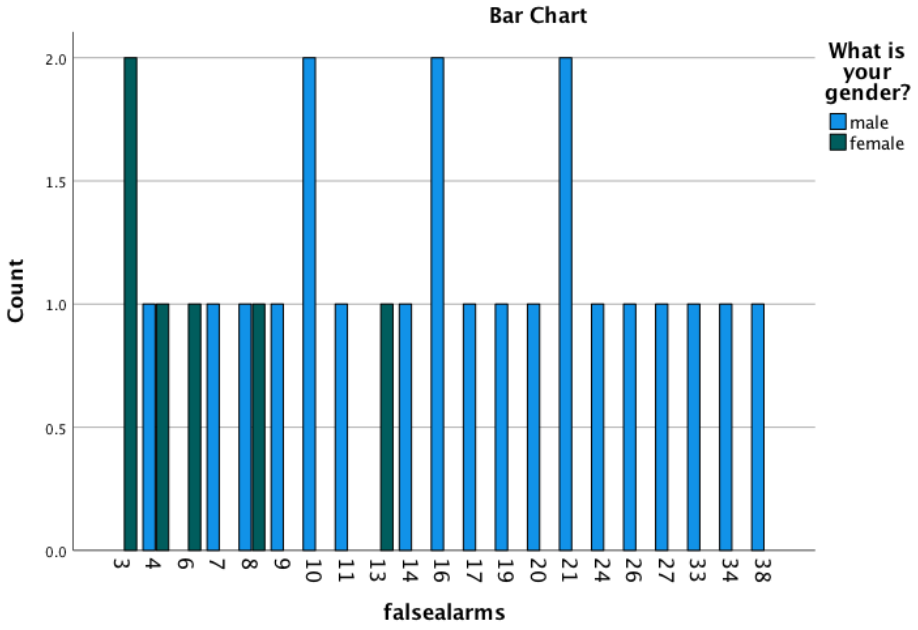

Figure 14: False alarms rate across gender

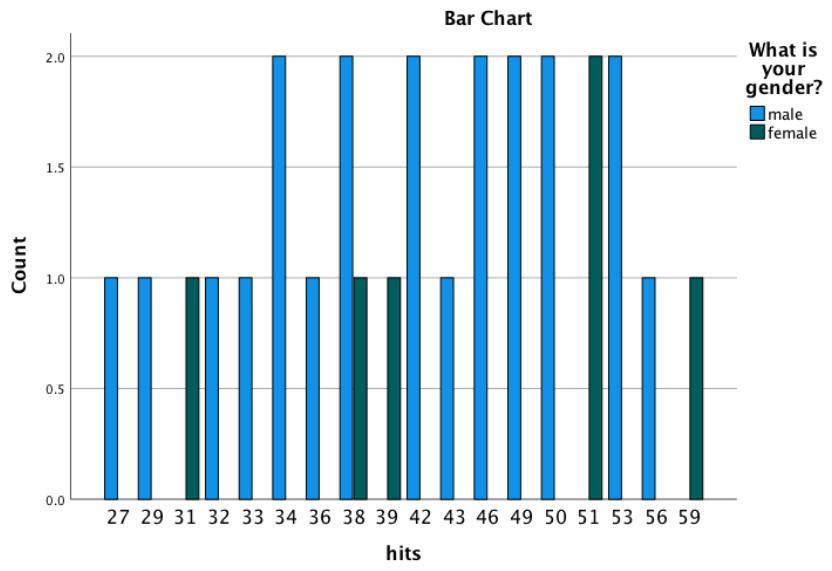

Figure 15: Hits rate across gender

7.2.2. What game activities on the micro- and macro-involvement levels are most practiced by the Tomb Raider players?

As explained before, micro-involvement activities are those that occur during gameplay, such as interactions in a written and or a voice chats, which are the built-in options provided by the game software. Macro-involvement activities are usually practiced after the game is over and include the use of external resources and paratexts.

As for the Tomb Raider gameplay and game-related activities, the general tendency in the sample group demonstrates that certain macro-involvement activities are more preferred to micro-involvement practices by both male and female players. For instance, the rare interaction in a voice or a written chat is observed across both male and female participants. As such, 81.5% which corresponds to 22 respondents out of 27 never, rarely or sometimes interact in a written chat in English. Furthermore, 92.6% which corresponds to 25 respondents out of 27 never, rarely or sometimes interact in a voice chat in English (for the frequency tables see paragraph 7.1.3.).

The frequencies of macro-involvement activities significantly vary. As previously discussed, the game-related activities can be clustered into several groups according to the measurement of central tendency (for the descriptive statistics table see section 7.1.3.). As such, they can be differentiated as the most frequent activities, the rarely or occasionally practiced activities and the never practiced activities.

The most frequent practices contain watching Tomb Raider related video content in English (*N* =27, *Mdn* =5, *Mode* = 5), consulting external resources in English (*N* =27, *Mdn* =5, *Mode* = 5), reading news or updates regarding Tomb Raider in English (*N* =27, *Mdn* =4, *Mode* = 5), reading walkthroughs or game guides in English (*N* =27, *Mdn* =4, *Mode* = 4). Furthermore, the rarely practiced activities among Tomb Raider players are watching Tomb Raider based movies in English (*N* =27, *Mdn* =3, *Mode* = 5), visiting Tomb Raider forums, blogs and websites (*N* =27, *Mdn* =3, *Mode* = 3), listening to Tomb Raider podcasts in English (*N* =27, *Mdn* =2, *Mode* = 2) and contribution to forums, blogs or websites in English (*N* =27, *Mdn* =3, *Mode* = 1).

It should be noted that there are certain activities which are reported by the players as almost never practiced, such as reading other people's Tomb Raider fan fiction in English (*N* =27, *Mdn* =1, *Mode* = 1), writing Tomb Raider fan fiction in English (*N* =27, *Mdn* =1, *Mode* = 1), cosplaying Lara Croft and Tomb Raider characters in English (*N* =27, *Mdn* =1, *Mode* = 1).

The frequency distribution of each macro-level activity is also calculated (for the frequency tables B.18 - B.28 see Appendix B) and summarized in the table below. The findings illustrate that the most frequent activities are consulting external sources in English (70.4%), reading walkthroughs and guides in English (66,6%), watching game related video content in English (59.3%), reading news and updates in English (55.5%) and watching Tomb Raider based movies in English (48.1%).

Interestingly, according to the measures of central tendency the variable watching Tomb Raider based movies in English has the median score of 3 and the mode 5 (*N* =27, *Mdn* =3, *Mode* = 5) which means that many players gave *quite frequent* answer, while *sometimes* answer is an average point in the distribution. The frequency analysis displays that these parameters

approximate. However, the percent of respondents (48.1%) who *quite frequently* and *often* watch Tomb Raider based movies outnumbers those who watch these movies *sometimes* and *rarely* (40.7%).

Furthermore, to the rarely practiced activities belong interaction in a written chat in English (44.4%), visiting game related forums, blogs, websites (48.1%), contributing to forums, blogs, websites in English (55.5%) and listening Tomb Raider related podcasts in English (62.9%). Also, it should be stressed that there are activities with a high frequency of *never* answers, such as interaction in a voice chat in English (63%), reading Tomb Raider fan fiction in English (66.7%), cosplaying Tomb Raider in English (70.4%), writing Tomb Raider fan fiction in English (85.2%). These estimates signal that the majority of players are never involved in this set of micro- and macro-activities.

In conclusion, the most practiced activities among the Tomb Raider players are those which occur on the macro-involvement level and ensure English learning through game paratexts and external tangential sources. Less practiced are the activities which are related to learning through interaction with others, such as visiting and contributing to forums, for instance. Micro-involvement practices which suggest learning through gameplay are less preferred among the players. (See Appendix B Tables B.18-B.28).

Variable	Quite frequently Often	Sometimes Rarely	Never
Interaction in a written chat in English	18.5%	**44.4**%	37%
Interaction in a voice chat in English	7.4%	29.6%	**63**%
Consulting external sources in English	**70.4%**	14.8%	14.8%
Reading walkthroughs and guides in English	**66.6%**	18.5%	14.8%
Watching game related video content in English	**59.3%**	37%	3.7%
Reading news and updates in English	**55.5%**	33.3%	11.1%
Watching Tomb Raider based movies in English	**48.1%**	40.7%	11.1%

Visiting game related forums, blogs, websites	40.7%	**48.1%**	11.1%
Contributing to forums, blogs, websites in English	11.1%	**55.5%**	33.3%
Listening Tomb Raider related podcasts in English	3.7%	**62.9%**	33.3%
Reading Tomb Raider fan fiction in English	3.7%	29.6%	**66.7%**
Writing Tomb Raider fan fiction in English	0%	14.8%	**85.2%**
Cosplaying Tomb Raider characters in English	0%	29.6%	**70.4%**

Table 21: Frequency of responses on micro- and macro-involvement activities

7.2.3. What is the performance of the Tomb Raider players in the Yes/No vocabulary test?

According to the measurements of the mean parameter, the average score of the sample is 0.31 (*N* = 27, *M* = 0.31, *SD* = 0.27, *Mdn* = 0.3, *range* = 0.97, *S* = 0.27, *K* = - 0.81) (for the descriptive statistics see section 7.1.4). Since the measures of the mean and the median mirror each other, it suggests that the distribution of the data is almost symmetric and just slightly deviates from the norm (Larson-Hall 2016:80). The average score of the false alarms is 15.63 (*N* = 27, *M* =15.63, *SD*= 9.9, *Mdn* = 14, *range* = 35), while the mean score of the hits is 42.56 (*N* = 27, *M* =42.56, *SD*= 8.8, *Mdn* = 42, *range* = 32).

Descriptives

			Statistic	Std. Error
falsealarms	Mean		15.63	1.905
	95% Confidence Interval for Mean	Lower Bound	11.71	
		Upper Bound	19.55	
	5% Trimmed Mean		15.15	
	Median		14.00	
	Variance		98.011	
	Std. Deviation		9.900	
	Minimum		3	
	Maximum		38	
	Range		35	
	Interquartile Range		13	
	Skewness		.679	.448
	Kurtosis		-.335	.872

Table 22: Descriptive statistics of false alarms variable

Descriptives

			Statistic	Std. Error
hits	Mean		42.56	1.712
	95% Confidence Interval for Mean	Lower Bound	39.04	
		Upper Bound	46.07	
	5% Trimmed Mean		42.52	
	Median		42.00	
	Variance		79.103	
	Std. Deviation		8.894	
	Minimum		27	
	Maximum		59	
	Range		32	
	Interquartile Range		16	
	Skewness		.005	.448
	Kurtosis		-1.099	.872

Table 23: Descriptive statistics of hits variable

In order to interpret the group performance in the Yes/No vocabulary test, the mean score is compared to the hypothetical proficiency and response bias levels as suggested by Huibregste et al (2002:234-237 as illustrated in a table in Mochida & Harrington 2006:77-78). Each level is represented by the values obtained according to four scoring methods, including the formula *h-f* or the hits rate minus the false alarm rate. This formula is used to calculate the score in the Yes/No vocabulary test per each participant in the context of the present study.

As such, the values demonstrate that the mean score of *h - f* (*M* = 0.31), the hit mean (*h* = 42.56) and the false alarms mean (*f* = 15.63) correspond to the low-level performance (*h-f* =0.3; *h* =0.4, *f* = 0.1) and moderate response bias as suggested by Huibregste et al (2002:234-237 as cited in Mochida & Harrington 2006:77-78). For instance, the average *h -f* score of 0.4-0.55 with the hit rate of 0.6 corresponds to the intermediate proficiency level, while the average *h-f* score of 0.6-0.75 with the hit rate of 0.8 is a marker of the advanced level performance (Mochida & Harrington 2006:77-78). However, Mochida & Harrington (2006:78) emphasize that these parallels between proficiency levels and responses biases are approximate.

In addition, it should be stressed that the Tomb Raider Yes/No vocabulary test is based on the low-frequency game-dependent lexis and as a rule, the rare words do not belong to the frequency bands 2K, 3K, 5K, 10K and AWL that are the base of VLT tests, the *h-f* scores of which were discussed by Mochida & Harrington (2006:85). Also, Huibregste et al (2002:229) display in their

study the scores in the English as a Foreign Language Vocabulary Test which is based on the word frequency bands.

Moreover, the Spearman's correlation of the mean score and the self-reported proficiency level of the sample group (N = 27, p = 0.280, r_S = - 0.216) does not indicate a relationship between these two variables. It suggests that a test taker's performance in the Yes/No vocabulary test is not related to the individual language proficiency level.

Correlations

			testscore	How would you rate your English level?
Spearman's rho	testscore	Correlation Coefficient	1.000	-.216
		Sig. (2-tailed)	.	.280
		N	27	27
	How would you rate your English level?	Correlation Coefficient	-.216	1.000
		Sig. (2-tailed)	.280	.
		N	27	27

Table 24: Correlation estimates of testscore and language proficiency levels

It is interesting to note that the scatterplot below illustrates that 4 out of 6 test takers who described their language proficiency level as advanced gained test scores below 0.2. Also, scores below 0.2 were attributed to 3 intermediate level and 3 upper-intermediate level participants.

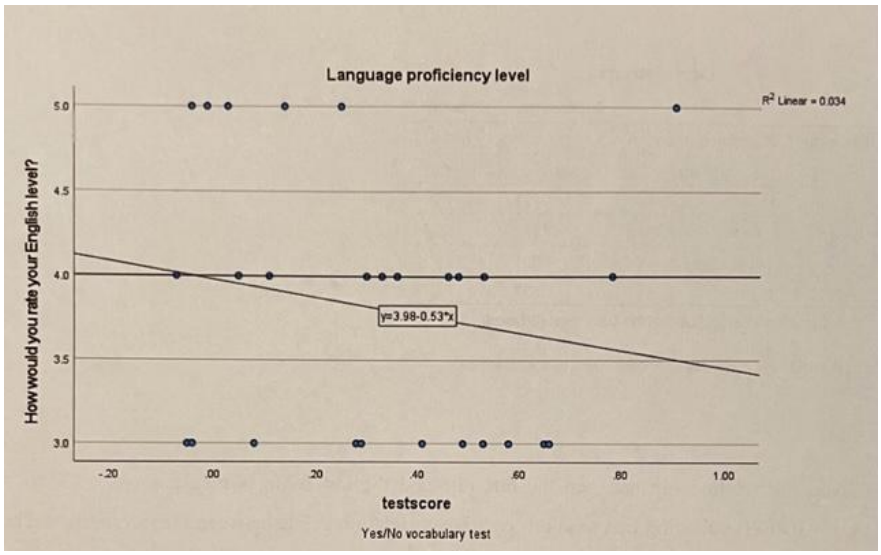

Figure 16: Scatterplot of test scores distribution across English language proficiency levels

However, bearing in mind that the Yes/No vocabulary test is based on the rare lexis selected from the Tomb Raider walkthroughs which hypothetically should be consulted by the players; and taking into account that the participants were not informed and prepared for the test in advance, it can be concluded that the group score in the Yes/No vocabulary test cannot be interpreted according to the comparative table suggested by Huibregste et al (2002:234-237 as cited in Mochida & Harrington 2006:77-78).

Furthermore, two Pearson's correlation tests are run to explore the relationship between the overall hits and false alarms rates and the mean test score. The correlation statistics of the false alarms rate and the test score (N = 27, p = 0.001, r = - 0.835) suggests that there is a strong negative correlation between these variables. The large negative effect size (r = - 0.835) indicates that if the number of false alarms decreases, the overall test score will increase correspondingly.

Correlations

		falsealarms	testscore
falsealarms	Pearson Correlation	1	-.835**
	Sig. (2-tailed)		<.001
	N	27	27
testscore	Pearson Correlation	-.835**	1
	Sig. (2-tailed)	<.001	
	N	27	27

**. Correlation is significant at the 0.01 level (2-tailed).

Table 25: Correlation estimates of testscore and falsealarms rate

Moreover, the relationship between the hits rate and the test score is measured (N = 27, p = 0.014, r = 0.468) indicating that medium positive correlation exists between these variables. The medium effect size (r = 0.468) suggests that the test performance enhances if the hits rate increases.

Correlations

		testscore	hits
testscore	Pearson Correlation	1	.468*
	Sig. (2-tailed)		.014
	N	27	27
hits	Pearson Correlation	.468*	1
	Sig. (2-tailed)	.014	
	N	27	27

*. Correlation is significant at the 0.05 level (2-tailed).

Table 26: Correlation estimates of testscore and hits rate

In this respect, in order to have a comprehensive picture of the hits and the false alarms, their frequencies in the Yes/No vocabulary test are also calculated (see Appendix B Table B.29 and Table B.30). It is interesting to note that the table of hits frequencies (see below) shows that 51 out of 60 hits have over 50% recognition per sample and only 9 existent words, namely *frescoes, quechua, ziggurat, crustacean, chuspa, persimmon, peccary, uturuncu, athanatoi* are indicated as recognized by Tomb Raider players with the frequency below 50%.

At the same time, the analysis of the false alarms which are compiled in the table of false alarms frequencies, shows that 9 pseudowords, such as *ceramical, amulette, alarmly, volcanious, hallucinogenios, phanteon, sarkofag, fuselarge, hideoutness* have high rate of recognition (over 50% per sample) which means that these words were mistakenly recognized by many players as existent English words.

It should be stressed that albeit the number of high frequency hits and false alarms is equal, their impact on the test score significantly differs because they fulfill different functions in the interpretation of the test result. The degree of influence of the hits and the false alarms on the test performance has been measured by the above mentioned correlation tests which suggest that the number of false alarms should be lower while the number of hits should be higher in order to achieve a high test score.

Table 27: Table of hits frequencies

Hits	TOTAL	TOTAL %
machete	27	100%
siberian	27	100%
mongolian	27	100%
soviet	27	100%
jade	26	96%
dagger	26	96%
glacier	25	93%
obsidian	25	93%
constantinople	25	93%
darts	25	93%
byzantine	25	93%
constellation	24	89%
snowdrift	24	89%
mural	24	89%
shantytown	24	89%
monolith	24	88%
cavern	23	85%
scavenger	23	85%
edible	23	85%
counterclockwise	23	85%
cataclysm	23	85%
himiko	22	81%
gulag	22	81%
piranhas	22	81%
eel	22	81%
yamatai	21	78%
canister	20	74%
famine	20	74%
pagan	20	74%
yucatan	20	74%
paititi	19	70%
momentarily	19	70%
lynx	19	70%
aquduct	19	70%
kukulkan	18	67%
cozumel	18	67%
capybara	18	67%
mackintosh	18	67%
chalice	18	67%
stalagmite	18	67%
effigy	17	63%
incense	17	63%
ossuary	17	63%
yaga	17	63%
macabre	17	63%
tether	16	59%
trebuchet	15	56%
yucatec	15	56%
kitezh	14	52%
antlers	14	52%
balustrade	14	52%
frescoes	13	48%
quechua	12	44%
ziggurat	12	44%
crustacean	12	44%
chuspa	9	33%
persimmon	9	33%
peccary	9	33%
uturuncu	7	26%
athanatoi	2	7%

Table 28: Table of false alarms frequencies

False alarms	TOTAL	TOTAL %
ceramical	24	89%
amulette	22	81%
alarmly	20	74%
volcanious	19	70%
hallucinogenios	18	67%
phanteon	17	63%
sarkofag	17	63%
fuselarge	15	56%
hideoutness	14	52%
katakomb	13	48%
wilderment	13	48%
krimson	12	44%
peruvious	12	44%
ambre	11	41%
angar	11	41%
kathedral	11	41%
profet	10	37%
unwreckage	9	33%
encampmenting	9	33%
shrain	9	33%
krusifix	9	33%
ekscavate	9	33%
fatigs	9	33%
enigmaful	9	33%
whitch	9	33%
astronavt	8	30%
cerpent	8	30%
invulnerous	8	30%
geolog	8	30%
zitadel	7	26%
dessipher	6	22%
inbush	6	22%
ivesdrop	6	22%
avalansh	6	22%
aicicles	6	22%
regalium	6	22%
stalaktit	6	22%
akwatik	5	19%
dizguize	5	19%
thunderklap	5	19%

Additionally, the Yes/No test results are measured in regard to the game involvement levels to explore whether the degree of involvement with the game influences the test performance. The correlation analysis (N = 27, p = 0.573, r_S = - 0.113) suggests that the test scores are not related to players' identity as gamers.

Correlations

			testscore	How would you rate your game involvement level?
Spearman's rho	testscore	Correlation Coefficient	1.000	-.113
		Sig. (2-tailed)	.	.573
		N	27	27
	How would you rate your game involvement level?	Correlation Coefficient	-.113	1.000
		Sig. (2-tailed)	.573	.
		N	27	27

Table 29: Correlation estimates of testscore and game involvement

7.2.4. Is there a relationship between the performance in the Yes/No vocabulary test and the exposure to the variety of micro- and macro-involvement activities?

It is hypothesized that the test results might be dependent on the frequency of exposure to the game related contexts where the learning of the rare words occurs through their repetition. In this connection, it is of particular interest to explore, whether the relationship between the exposure to the gameplay and game related activities and the performance in the Yes/No vocabulary test exists.

The relationship between the mean score in the Yes/No vocabulary test and the exposure to the micro- and macro-involvement activities is measured by means of the Spearman's rho test. In total, 13 types of activities are analyzed, including 2 types of activities occurring during gameplay, such as interaction in a written and oral chats, and 11 types of macro-involvement practices.

As such, the analysis of both estimates (see the correlation table below), such as *p*-value (ρ = 0.05) for two-tailed tests and correlation coefficients, indicates that out of 13 micro-and macro-level activities the significant positive relationship exists only between the test performance and the frequency of watching Tomb Raider based movies (95% *CI* [-0.431; 0.344], N = 27, ρ = 0.009, r_S = 0.496). The strong statistical significance and the medium effect size (r_S = 0.496) suggests that the exposure to watching Tomb Raider based movies can enhance the scores in the Yes/No vocabulary test.

Since the estimates of the positive correlation between the test score and the exposure to watching Tomb Raider based movies are known, it is possible to square the correlation coefficient and measure the proportion of variability of one variable, such as the test score, shared by another variable, such as the frequency of watching the Tomb Raider based movies (Field 2018:471). Hence, the value of R^2 is 0.246 which indicates that 24.6% of the variability in the test score is shared by the exposure to watching Tomb Raider based movies.

Correlations

			How often do you interact with other people in English in a written chat during Tomb Raider gameplay?	How often do you interact with other people in a voice chat in English during Tomb Raider gameplay?	How often do you read Tomb Raider walkthroughs / or guides in English?	How often do you watch Tomb Raider related video content (trailers, previews, etc.) in English?	How often do you visit Tomb Raider forums, blogs or websites in English?	How often do you contribute to Tomb Raider forums, blogs or websites in English?	How often do you read news or updates regarding the Tomb Raider franchise in English on the Internet?	How often do you read other people's Tomb Raider fan fiction in English?	How often do you write your own Tomb Raider related fan fiction in English?	How often do you watch Tomb Raider based movies in English?	How often do you listen to Tomb Raider related podcasts in English?	How often do you cosplay Lara Croft or other Tomb Raider characters referring to resources in English (apps, tutorials, websites, etc.)	How often do you consult external resources in English, such as Wikipedia, maps, YouTube, books, for additional information?	testscore
Spearman's rho	How often do you interact with other people in English in a written chat during Tomb Raider gameplay?	Correlation Coefficient	1.000	.559**	.128	.319	.451*	.452*	.251	.634**	.265	-.051	.352	.042	.243	.125
		Sig. (2-tailed)	.	.002	.526	.105	.018	.018	.207	.000	.181	.801	.072	.834	.222	.535
		N	27	27	27	27	27	27	27	27	27	27	27	27	27	27
	How often do you interact with other people in a voice chat in English during Tomb Raider gameplay?	Correlation Coefficient	.559**	1.000	-.124	-.010	.062	.348	-.123	.384*	.232	.193	.257	.408*	.318	.202
		Sig. (2-tailed)	.002	.	.539	.960	.759	.075	.541	.048	.244	.335	.195	.035	.107	.313
		N	27	27	27	27	27	27	27	27	27	27	27	27	27	27
	How often do you read Tomb Raider walkthroughs/ or guides in English?	Correlation Coefficient	.128	-.124	1.000	.271	.478*	.016	.260	-.099	-.032	-.075	.054	-.097	.525**	-.117
		Sig. (2-tailed)	.526	.539	.	.172	.012	.935	.191	.625	.872	.708	.788	.629	.005	.562
		N	27	27	27	27	27	27	27	27	27	27	27	27	27	27
	How often do you watch Tomb Raider related video content (trailers, previews, etc.) in English?	Correlation Coefficient	.319	-.010	.271	1.000	.614**	.635**	.832**	.265	.380	.133	.096	.179	.224	.313
		Sig. (2-tailed)	.105	.960	.172	.	.001	.000	.000	.181	.051	.507	.633	.372	.261	.112
		N	27	27	27	27	27	27	27	27	27	27	27	27	27	27
	How often do you visit Tomb Raider forums, blogs or websites in English?	Correlation Coefficient	.451*	.062	.478*	.614**	1.000	.469*	.669**	.230	.399*	-.098	.274	.040	.293	.068
		Sig. (2-tailed)	.018	.759	.012	.001	.	.013	.000	.248	.039	.626	.167	.843	.138	.736
		N	27	27	27	27	27	27	27	27	27	27	27	27	27	27
	How often do you contribute to Tomb Raider forums, blogs or websites in English?	Correlation Coefficient	.452*	.348	.016	.635**	.469*	1.000	.570**	.270	.404*	.025	.147	.124	.263	.350
		Sig. (2-tailed)	.018	.075	.935	.000	.013	.	.002	.173	.037	.903	.466	.539	.186	.073
		N	27	27	27	27	27	27	27	27	27	27	27	27	27	27
	How often do you read news or updates regarding the Tomb Raider franchise in English on the Internet?	Correlation Coefficient	.251	-.123	.260	.832**	.669**	.570**	1.000	.320	.426*	.061	.350	.110	.162	.235
		Sig. (2-tailed)	.207	.541	.191	.000	.000	.002	.	.104	.027	.764	.073	.587	.420	.239
		N	27	27	27	27	27	27	27	27	27	27	27	27	27	27
	How often do you read other people's Tomb Raider fan fiction in English?	Correlation Coefficient	.634**	.384*	-.099	.265	.230	.270	.320	1.000	.456*	.167	.366	.288	.085	.379
		Sig. (2-tailed)	.000	.048	.625	.181	.248	.173	.104	.	.017	.405	.060	.146	.673	.051
		N	27	27	27	27	27	27	27	27	27	27	27	27	27	27
	How often do you write your own Tomb Raider related fan fiction in English?	Correlation Coefficient	.265	.232	-.032	.380	.399*	.404*	.426*	.456*	1.000	.196	.333	.445*	-.013	.051
		Sig. (2-tailed)	.181	.244	.872	.051	.039	.037	.027	.017	.	.327	.090	.020	.950	.799
		N	27	27	27	27	27	27	27	27	27	27	27	27	27	27
	How often do you watch Tomb Raider based movies in English?	Correlation Coefficient	-.051	.193	-.075	.133	-.098	.025	.061	.167	.196	1.000	.019	.324	.314	.496**
		Sig. (2-tailed)	.801	.335	.708	.507	.626	.903	.764	.405	.327	.	.925	.100	.110	.009
		N	27	27	27	27	27	27	27	27	27	27	27	27	27	27
	How often do you listen to Tomb Raider related podcasts in English?	Correlation Coefficient	.352	.257	.054	.096	.274	.147	.350	.366	.333	.019	1.000	.330	.258	.041
		Sig. (2-tailed)	.072	.195	.788	.633	.167	.466	.073	.060	.090	.925	.	.093	.195	.839
		N	27	27	27	27	27	27	27	27	27	27	27	27	27	27
	How often do you cosplay Lara Croft or other Tomb Raider characters referring to resources in English (apps, tutorials, websites, etc.)	Correlation Coefficient	.042	.408*	-.097	.179	.040	.124	.110	.288	.445*	.324	.330	1.000	.110	-.058
		Sig. (2-tailed)	.834	.035	.629	.372	.843	.539	.587	.146	.020	.100	.093	.	.585	.775
		N	27	27	27	27	27	27	27	27	27	27	27	27	27	27
	How often do you consult external resources in English, such as Wikipedia, maps, YouTube, books, for additional information?	Correlation Coefficient	.243	.318	.525**	.224	.293	.263	.162	.085	-.013	.314	.258	.110	1.000	.331
		Sig. (2-tailed)	.222	.107	.005	.261	.138	.186	.420	.673	.950	.110	.195	.585	.	.092
		N	27	27	27	27	27	27	27	27	27	27	27	27	27	27
	testscore	Correlation Coefficient	.125	.202	-.117	.313	.068	.350	.235	.379	.051	.496**	.041	-.058	.331	1.000
		Sig. (2-tailed)	.535	.313	.562	.112	.736	.073	.239	.051	.799	.009	.839	.775	.092	.
		N	27	27	27	27	27	27	27	27	27	27	27	27	27	27

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 30: Correlation estimates of testscore and micro- and macro-involvement activities

In addition, the scatterplot below illustrates the frequency distribution of watching Tomb Raider based movies across the test performance. It indicates that the players who scored in the Yes/No vocabulary test from 0.2-0.8 have frequent exposure to Tomb Raider movies.

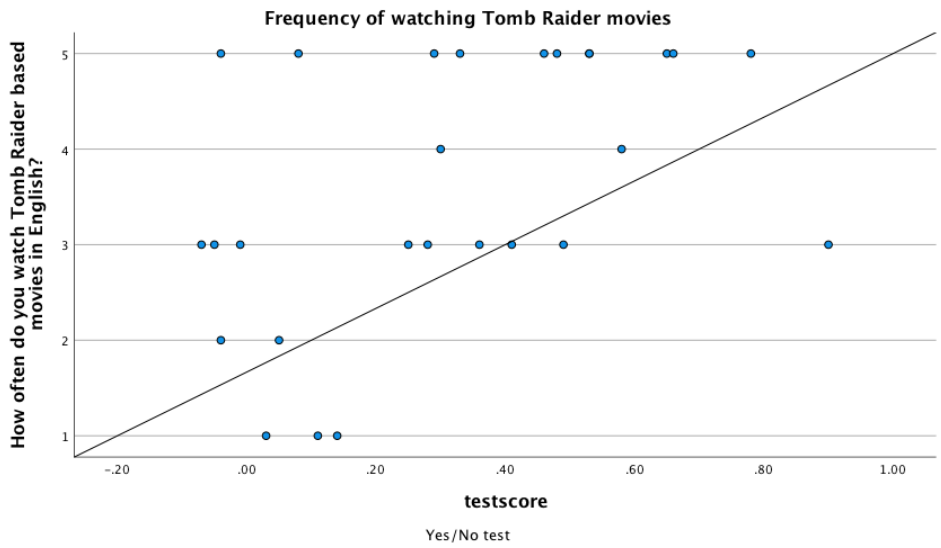

Figure 17: Scatterplot of testscore and frequency of watching Tomb Raider movies

7.2.5. Is there a relationship between the performance in the Yes/No vocabulary test and the gameplay frequency per week?

The relationship between the mean score in the Yes/No vocabulary test and the frequency of the gameplay in English per week is measured with the Spearman's rho test. The estimates do not indicate any statistical significance, which means that the test performance is not influenced by the duration of the gameplay per week (95% CI [-0.4; 0.28], N = 27, p = 0.620, r_S = - 0.1).

Correlations

					testscore	How many hours do you play Tomb Raider in English per week?
Spearman's rho	testscore	Correlation Coefficient			1.000	-.100
		Sig. (2-tailed)			.	.620
		N			27	27
		Bootstrap[c]	Bias		.000	.002
			Std. Error		.000	.187
			95% Confidence Interval	Lower	1.000	-.467
				Upper	1.000	.281
	How many hours do you play Tomb Raider in English per week?	Correlation Coefficient			-.100	1.000
		Sig. (2-tailed)			.620	.
		N			27	27
		Bootstrap[c]	Bias		.002	.000
			Std. Error		.187	.000
			95% Confidence Interval	Lower	-.467	1.000
				Upper	.281	1.000

c. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Table 31: Correlation estimates of tescscore and Tomb Raider gameplay in English per week

8. Discussion

The present study aims at exploring how vocabulary acquisition occurs through playing Tomb Raider video games. A variety of gameplay and game-related activities as well as their impact on the performance in the Yes/No vocabulary test are investigated. The participants of the study are the Tomb Raider gamers who are recruited among friends and in Facebook groups, including *Tomb Raider Poland* and *Lara Croft Poland*, *Allgamestuff.com* Italy.

Two methodological instruments are employed in the research, namely the online questionnaire with the embedded Yes/No vocabulary test. The questionnaire includes questions on the linguistic, demographic and educational background of the group as well as a set of questions on the gameplay and game-related habits. The Cronbach's test ($\alpha = 0.8$) is run in SPSS to evaluate the consistency of the construct and signals the acceptable reliability of the scale.

The Yes/No test includes 60 English real words as well as 40 pseudowords and follows Paul Meara's Yes/No vocabulary test methodology. The list of words consists of the topic-dependent lexis, namely geographical, archeological, cultural and historical terms, which occur in the Tomb Raider trilogy walkthroughs. These terms are selected from the frequency list which was previously processed by the *AntWordProfiler* application.

Data collection happened to be the most challenging and time consuming stage of the project. In total, 27 participants volunteered to take part in the study, including 21 male and 6 female players. The respondents are non-native English speakers who widely use English when communicating with their friends, at work or for their studies. The native languages of the participants are Arabic, French, German, Italian, Polish, Ukrainian and Spanish. The self-reported average level of English language proficiency of the sample is upper-intermediate with the mean 13.8 years of English learning.

Albeit the gender aspect is not a main focus of the research, the demographic characteristic of the sample (77.8% male and 22.2% female players) goes in line with a wealth of studies in the field of digital gaming which suggests that the world of computer games is still a male-dominated

space, though the number of female players increases yearly. For instance, the Entertainment Software Association (ESA) Report 2022 (https://www.theesa.com) illustrates that the American game community is represented by 52% male and 48% female players across all ages, while in 2021 these numbers were 55% and 45% correspondingly. Also, the study on digital gaming and informal learning by Iacovides et al. (2012:323) displayed the proportion of male and female respondents as 53.9% to 45.7%. The gender statistics in the present study is only descriptive and thus cannot go beyond the sample.

Furthermore, the age variable was measured to shed additional light on the demographic characteristic of the sample. Hence, the average age of the group is 27.78 years with the age range 18-50 years. Moreover, given the continuous success of the Tomb Raider franchise on the computer video games market for around 30 years, the popularity of the game across all ages is never-ending. While multiple studies in the field of digital gaming focus on young English learners (Jensen 2017:6, Sylven & Sundqvist 2012: 308), the fact that computer games are preferred leisure activity across all ages is undeniable.

For instance, according to the Entertainment Software Association (ESA) Report 2022 (https://www.theesa.com) the average age of the US video game player is 33 years old. The age range varies from 18 to over 65 (76%) including the age band 18-34 with the highest frequency (36%) and under 18 years (24%). Moreover, Iacovides et al. (2012:323) also explored the age categories from 18 to over 65 years in relation to game involvement and learning displaying the age band 26-35 years as one with the highest frequency (42.2%).

It is worth emphasizing that players' identity is the factor which can influence the duration of gameplay as well as the engagement with game-related activities. The statistics demonstrate that the Tomb Raider sample consists of 48.1% casual gamers, 44.4% moderate gamers and 7.4% hardcore gamers. On average the sample group plays Tomb Raider in English up to 5 hours weekly. However, it should be stressed that hardcore gamers spend more time playing than average, namely 22 hours and more. These findings go in line with the Iacovides' et al. (2012:324) research where casual and moderate gamers outnumber the hardcore gamers but the last seem to dedicate the maximum amount of time (15 hours and more) to gaming.

Furthermore, Iacovides et al. (2011:12) suggest that gamers' identity and duration of gameplay are interrelated factors which can explain how informal learning occurs through games. In this connection, the present study runs the correlation calculations (*CI* 95 [-0.4; 0.41], *N*=27, p = 0.964, r_S = 0.009) of duration of gameplay in English per week and game involvement levels. The estimates suggest that there is no relationship between these two variables, which means that players' identity is not influenced by the time spent on playing Tomb Raider in English.

Another variable which is taken into consideration is the English language proficiency level. As such, 40.7% of respondents reported an intermediate level, 37% an upper-intermediate and 22.2% an advanced level. The measures of central tendency suggest that the average level of the sample group is upper-intermediate (*N* = 27, *SD* = 0.78, *Mode* = 3, *Mdn* = 4). However, the correlation statistics of the test scores and language proficiency variables (*N*=27, p = 0.28, r_S = -0.216, R^2 = 0.034) suggests that the self-reported language proficiency level is not related to the overall performance in the Yes/No vocabulary test.

It should be noted that the overall group performance in the Yes/No vocabulary test is the mean score 0.31 (*N* = 27, *M* = 0.31, *SD* = 0.27, *Mdn* = 0.3, *range* = 0.97, *S* = 0.27, *K* = - 0.81). The mean false alarms rate is 15.53, while the average hits rate is 42.56. The group score is compared to the hypothetical proficiency and response bias levels as suggested by Huibregste et al (2002:234-237 as illustrated in Mochida & Harrington 2006:77-78) and corresponds to the low-performance level. However, it should be emphasized that such a comparison is only approximate, because the Tomb Raider Yes/No vocabulary test includes the low-frequency game-dependent lexis, while the Yes/No tests discussed by Mochida & Harrington (2006:85) and Huibregste et al (2002:229) are based on the word frequency bands.

In addition, the overall high number of false alarms lowered the individual performance as well as the mean score. Also, Mochida & Harrington (2006:75) stress that "high false alarms indicate high degree of guessing". Additionally, it is worth mentioning that the correlation statistics of the test score, the hits rate (*N* = 27, p = 0.014, *r* = 0.468) and the false alarm rate (*N* = 27, p = 0.001, *r* = - 0.835) demonstrate that the low false alarm rate enhances the test performance as well as the average and high hits rate yields increased test results. These findings also go in

line with the methodology of the Yes/No vocabulary test which foregrounds the false alarms rate as an indispensable measure for scoring and interpretation of the test results. It adjusts the number of hits and corrects overestimates, thus bringing reliable results (Mochida & Harrington 2006:79).

Furthermore, since the Yes/No vocabulary test is based on the Tomb Raider topic-dependent lexis which usually does not belong to the high frequency bands and can only be encountered and learned through continuous repetition in the game-related contexts, it is hypothesized that frequent exposure to gameplay and game-related contexts can enhance the scores in the Yes/No vocabulary test. Therefore, players' frequency exposure to micro- and macro-involvement activities is measured and analyzed in relation with the test performance ($N = 27$, $M = 0.31$).

The frequency distribution across thirteen activities allows differentiating between quite frequently/often, sometimes/rarely and never practiced activities. To quite frequently/often practiced activities belong 1) consulting external sources in English (70.4% of respondents), 2) reading walkthroughs and guides in English (66.6%), 3) watching game related video content in English (59.3%), 4) reading news and updates in English (55.5%), and 5) watching Tomb Raider based movies in English (48.1%). It is interesting to note that these findings also corroborate with the data in Iacovides' et al. (2012:323) study which foregrounds watching a game trailer, reading or watching game reviews, and visiting a gaming forum, blog or website as the most occurred activities.

At the same time, Iacovides' et al. (2012:324) stress that less than 50% of respondents contribute to gaming forums, blogs, etc. or listen to game related podcasts and even fewer read or write game-related fan fiction. The findings of the present study reflect the similar tendency when activities which involve creating Tomb Raider based content, such as writing fan fiction (85.2% of respondents), cosplaying (70.4%) or reading fan fiction (66.6%) are reported by players as never practiced. On the micro-involvement level 63% of respondents never interact in a voice chat in English.

As for the occasionally practiced activities, 62.9% of players rarely or sometimes engage in listening Tomb Raider related podcasts in English; 55.5% rarely or sometimes contribute to forums, blogs, websites in English; 48.1% rarely or sometimes visit game related forums, blogs, websites in English and 44.4% rarely or sometimes interact in a written chat in English during the gameplay.

Hence, the statistics illustrate that the Tomb Raider players frequently engage in the macro-level activities which provide opportunities for learning through game paratexts, such as game walkthroughs, guides, reviews, trailers, game based movies, etc, as well as through tangential external sources, such as Wikipedia, maps, books, dictionaries, etc. Additionally, Calleja (2011:39) singles out continuous engagement with a game and long-term motivation as salient attributes of macro-involvement. As for the gameplay activities, even though the Tomb Raider game mechanics provides a multiplayer mode, the interaction with others in a written and voice chats is quite rare. Moreover, the Spearman's rho test did not show any correlation between micro-level activities and the test performance.

It should be mentioned that Sylven & Sundqvist (2012:306) also stress the restricted potential of the single-player games for L2 learning. Unlike massively multiplayer online role-playing games (MMORPGs) which are constructed to motivate written and oral interaction with other players during the gameplay, in the single-player games the need for socializing, team work and thus written and oral output is not common (Sylven & Sundqvist 2012:306).

Taking this into consideration, the macro-involvement activities are statistically explored whether they are related to English vocabulary test performance since they are the most frequent practices among the Tomb Raider players. Out of thirteen game-related activities only *watching Tomb Raider based movies* has a positive significant correlation with the test score (95% *CI* [-0.431; 0.344], $N = 27$, $\rho = 0.009$, $r_S = 0.496$). The medium effect size suggests that enhanced frequency of exposure to game-based movies influences the increase of the Yes/No test performance.

This statistical outcome corroborates with the findings in Peters' (2020:157) research which also demonstrate a positive correlation between the exposure to movies in English without subtitles and vocabulary test results. However, in the context of the present study the players were not questioned whether they watched Tomb Raider movies with or without subtitles or captions.

The present research brings an interesting and unexpected finding because even though certain macro-level activities are more frequent among the Tomb Raider players, their statistical estimates do not demonstrate a significant correlation with the test score variable. It is important to note that the exposure to movies is a popular extramural activity too, offering rich audiovisual input which can be learned not only from the audio but also with the help of subtitling or captioning. Also, Schmitt & Schmitt (2020: 152) emphasize that frequent and repeated exposure to watching movies does enhance the incidental learning (Schmitt & Schmitt 2020:152).

Another aspect which was also explored in relation to the test performance is duration of the gameplay in English per week and its influence on the test scores. The statistical output (N=27, Mdn = 2, $Mode$ = 2, SD = 1.1) indicates that on average, the respondents spend up to 5 hours weekly playing the game in English. The casual players dedicate up to 5 hours weekly, the moderate players spend up to 5 hours and 6-14 hours weekly and the hardcore players spend more than 22 hours on gaming per week.

It is interesting to mention that the present findings echo a similar tendency described by Iacovides' et al. (2012:324) and Sylven & Sundqvist (2012:312). The study illustrates that a majority of casual players prefer to spend 5 hours or less weekly on gaming. The dominant number of moderate gamers dedicates 6-14 hours to gameplay per week, while hardcore gamers spend 15 hours or more on gaming (Iacovides' et al. 2012:324). In addition, the research by Sylven & Sundqvist (2012:312) illustrates that moderate gamers spend less than 5 hours weekly on gaming (1.5 hours on average), while frequent gamers engage with gaming 5 - 23 hours weekly (9.7 hours on average).

In addition, Sylven & Sundqvist (2012:315) stress the positive correlation between the vocabulary test scores and duration of the gameplay. Hence, taking this into consideration the

correlation analysis is performed. However, Spearman's rho test does not bring meaningful estimates (95% CI [-0.1; 0.620], N = 27, $p = 0.620$, $r_S = -0.1$), therefore it suggests that the time spent on playing Tomb Raider in English is not related to the Yes/No test performance. As it was discussed above, given the topic-dependent words included in the Yes/No vocabulary test their acquisition can be explained by the involvement in the frequent game-related activities than exclusively by the gameplay.

It is worth mentioning that the attitude of respondents to English learning through Tomb Raider playing is also measured. Many respondents agree that playing Tomb Raider in English contributes to vocabulary growth. As such, 12 respondents report on some help from gaming, while 13 participants stress on immense contribution of digital gaming to the vocabulary expansion. As the findings of the present study illustrate, the frequent exposures to a variety of game-related activities can contribute to the acquisition of topic-dependent lexis and thus, the receptive vocabulary growth. The results of the Yes/No vocabulary test which contains geographical, archeological, cultural and historical terms demostrate that the genre and focus of a video game have a potential to shape up the English vocabulary of players.

It is worth mentioning that this research is also subject to limitations. Although the present study fulfills a required minimum of the sample size (Read 2020:519, Larson-Hall 2016:239), it would be preferable to conduct further research involving a bigger sample with gender parity. This could bring additional findings on the gender distribution across the group. Also, it would be interesting to compare the performance of the Tomb Raider gamers and non-gamers in the same Yes/No vocabulary test. In addition, it might be interesting to request the Tomb Raider players of the same sample to repeat the Yes/No vocabulary test again and analyze the scores for possible improvement.

9. Conclusion

Digital gaming as an English extramural activity is a focal point of the emerging academic research which explores the potential of video games for informal English learning. The present research aims at discovering the mechanisms which account for English receptive vocabulary acquisition through gaming. The strength of this research lies in its focus on a particular genre of video games and the diversity of game micro- and macro-involvement activities.

Given the multiple studies in the field of extramural English which predominantly highlight the massively multiplayer online role-playing games (MMORPGs), the present study focuses on a single player game, the recent Tomb Raider trilogy. The participants of the study are the Tomb Raider gamers who are recruited among friends and in Facebook groups. The research employs two methodological instruments, namely the online questionnaire featuring questions on the linguistic, demographic and educational background of the group as well as a set of questions on the gameplay and game-related activities and the embedded Yes/No vocabulary test on game-dependent lexis.

Unlike MMORPGs which have technical properties allowing interaction with others while playing and thus opening new opportunities for language learning and practicing, the Tomb Raider gameplay does not seem to engage players into frequent oral and written communication. As the statistical findings illustrate the micro-involvement activities are practiced predominantly rarely by the majority of the Tomb Raider players. Therefore, it can be summed up that rare exposure to the micro-involvement activities cannot contribute to the acquisition of the low-frequency game-dependent vocabulary. This conclusion is supported by the statistical correlation outcome which indicates no relationship between the gameplay activities and the Yes/No vocabulary test results.

On the contrary, the macro-involvement activities which occur when the game is over seem to offer more opportunities for vocabulary learning. The statistical findings illustrate that certain macro-involvement activities are more frequently practiced than others. As such, the five most frequent extramural exposures are 1) consulting external sources in English, 2) reading

walkthroughs and guides in English, 3) watching game related video content in English, 4) reading news and updates in English, and 5) watching Tomb Raider based movies in English.

The frequent exposure to these activities is supposed to contribute to the individual and overall performance in the Yes/No vocabulary test because the acquisition of the rare lexis occurs through frequent and regular word encounters in different game-related contexts. However, no statistical relationship has been indicated between the vocabulary test performance and four most frequent activities as well as the occasionally and never practiced macro-involvement activities, such as writing and reading Tomb Raider fan fiction, cosplaying, listening Tomb Raider related podcasts, visiting and contributing to game forums, blogs, websites.

The only macro-involvement practice which positively correlates with the Yes/No test performance indicating medium effect size is the exposure to watching Tomb Raider based movies. This is an interesting finding because the exposure to movies is considered another popular English extramural activity which has huge potential for informal language learning. In this respect, the movies which are based on the Tomb Raider video game are the contexts which contain game-dependent vocabulary and allow players its unintentional acquisition through the audiovisual input.

Another aspect which is investigated in regard to the Yes/No vocabulary performance is the frequency of the gameplay. Unlike other research in the field, the present study does not illustrate a correlation between the test results and the time spent on gaming in English. It is assumed that since socialization with others during gaming is a rare practice, the duration of the gameplay does not have a significant influence on the vocabulary learning either.

As for limitations, further research involving a bigger sample with gender parity is recommended. Also, the comparison of the results of the Tomb Raider gamers and non-gamers in the same Yes/No vocabulary test could yield interesting findings. In addition, the repetition of the same Yes/No vocabulary test by the same sample group is recommended for further analysis.

Therefore, this thesis contributes to the existing research on extramural English because it sheds additional light on digital gaming as a multifaceted extramural exposure. Taking into account the above mentioned statements, it is concluded that like MMORPGs, single player games such as Tomb Raider, also have some potential for extramural English learning suggesting dimensions for the vocabulary acquisition different from those in MMORPGs. The findings suggest that a well-designed digital game has a potential to grow into a powerful learning space in case if it suggests resources for micro- and macro-involvement, which turn a digital game into a *big G Game.*

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Appendix A

The Tomb Raider questionnaire

Dear all,
I am a student conducting the research on the relationship between digital gaming and English vocabulary learning. I would kindly ask you to become a participant in my researchanswering questions and taking a short vocabulary test. It will take you around 20 minutesto complete the questionnaire. The research is aimed at people whose native language is NOT English. If you are an English native speaker, please do not fill out this questionnaire. Thank you!

---

* Required

Since the participation is anonymous, I ask you to provide your identification codeaccording to the template. Example: first two letters of your first name - NO; first two letters of your last name - VA; the month you are born in (in numbers) -
04. My Code is NOVA04

---

1. How often do you play Tomb Raider in English? Rate from 1 to 5 (1: never, 2: a fewdays a year, 3: a few days a month, 4: some days weekly, 5: daily).

	1	2	3	4	5	
never	◯	◯	◯	◯	◯	daily

---

2. How many hours do you play Tomb Raider in English per week? Rate from 1 to 5(1: never, 2: up to 5 hours, 3: 6-14 hours, 4: 15-21 hours, 5: 22 hours or more).

3. How often do you interact with other people in English in a written chat during Tomb Raider gameplay? Rate from 1 to 5 (1: never, 2: rarely, 3: sometimes, 4: often, 5:quite frequently).

1 2 3 4 5

never quite frequently

4. How often do you interact with other people in a voice chat in English during TombRaider gameplay? Rate from 1 to 5 (1: never, 2: rarely, 3: sometimes, 4: often, 5: quite frequently).

1 2 3 4 5

never quite frequently

5. How often do you read Tomb Raider walkthroughs/ or guides in English? Ratefrom 1 to 5 (1: never, 2: rarely, 3: sometimes, 4: often, 5: quite frequently).

1 2 3 4 5

never quite frequently

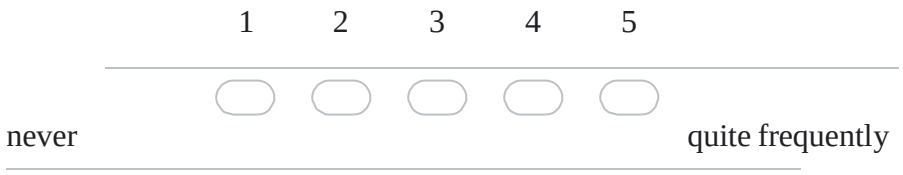
6. How often do you watch Tomb Raider related video content (trailers, previews, etc.) in English? Rate from 1 to 5 (1: never, 2: rarely, 3: sometimes, 4: often, 5: quite frequently).

7. How often do you visit Tomb Raider forums, blogs or websites in English? Ratefrom 1 to 5 (1: never, 2: rarely, 3: sometimes, 4: often, 5: quite frequently).

8. How often do you contribute to Tomb Raider forums, blogs or websites in English?Rate from 1 to 5 (1: never, 2: rarely, 3: sometimes, 4: often, 5: quite frequently).

9. How often do you read news or updates regarding the Tomb Raider franchise inEnglish on the Internet? Rate from 1 to 5 (1: never, 2: rarely, 3: sometimes, 4: often,5: quite frequently).

10. How often do you read other people's Tomb Raider fan fiction in English? Ratefrom 1 to 5 (1: never, 2: rarely, 3: sometimes, 4: often, 5: quite frequently).



11. How often do you write your own Tomb Raider related fan fiction in English?Rate from 1 to 5 (1: never, 2: rarely, 3: sometimes, 4: often, 5: quite frequently).

12. How often do you watch Tomb Raider based movies in English? Rate from 1 to5 (1: never, 2: rarely, 3: sometimes, 4: often, 5: quite frequently).

13. How often do you listen to Tomb Raider related podcasts in English? Rate from1 to 5 (1: never, 2: rarely, 3: sometimes, 4: often, 5: quite frequently).

14. How often do you cosplay Lara Croft or other Tomb Raider characters referring to resources in English (apps, tutorials, websites, etc.). Rate from 1 to 5 (1: never, 2:rarely, 3: sometimes, 4: often, 5: quite frequently).

	1	2	3	4	5	
never	○	○	○	○	○	quite frequently

15. If you run into a word/ or a concept that you do not know while playing Tomb Raider, how often do you consult external resources in English, such as Wikipedia,maps, YouTube, books, for additional information? Rate from 1 to 5 (1: never, 2: rarely, 3: sometimes, 4: often, 5: quite frequently).

	1	2	3	4	5	
never	○	○	○	○	○	quite frequently

16. Do you think that all you have learnt from Tomb Raider is how to play it? Rate from 1 to 5 (1: strongly disagree, 2: disagree, 3: neither, 4: agree, 5: strongly agree).

1 2 3 4 5

strongly disagree strongly agree

17. Please name three things you learn through playing Tomb Raider

18. How much do you think Tomb Raider helped you to expand your Englishvocabulary? Rate from 1 to 5 (1: not at all, 2: a little, 3: some help, 4: a lot, 5:immensely).

1 2 3 4 5

not at all immensely

19. Please type three words you learned playing Tomb Raider in English?

A
Yes/No
vocabulary test

You will see the list of words used in three recent Tomb Raider games. The words are divided into four blocks. You have to tick “yes” (☒ Yes) if you know the meaning of a word and “no” (☒ No) if the meaning of theword is unknown to you.
Please note, given the format, the test contains both real words and non- existent/or wrongly spelt words. Answering “yes” to a non-existent word will result in lowering the final score on the test. The test is not timed but it usually takes 10 minutes or less to finish it. Thank you and best of luck!

1. Example: *

	Yes	No
tomb	☐	☐
deesastterr	☐	☐

2. Block A: I know the meaning of the word

	Yes	No
monolith	☐	☐
unwreckage	☐	☐
paititi	☐	☐
encampmenting	☐	☐
cavern	☐	☐
phanteon	☐	☐
trebuchet	☐	☐
sarkofag	☐	☐
jade	☐	☐
dessipher	☐	☐
quechua	☐	☐
himiko	☐	☐
gulag	☐	☐
kitezh	☐	☐
kukulkan	☐	☐
hideoutness	☐	☐
scavenger	☐	☐
krimson	☐	☐

canister	☐	☐
inbush	☐	☐
cozumel	☐	☐
amulette	☐	☐
edible	☐	☐
katakomb	☐	☐
effigy	☐	☐

Block B: I know the meaning of the word

	Yes	No
shrain	☐	☐
incense	☐	☐
akwatic	☐	☐
ziggurat	☐	☐
fuselarge	☐	☐
piranhas	☐	☐
dizguize	☐	☐
glacier	☐	☐
ivesdrop	☐	☐
eel	☐	☐

alarmly	☐	☐
tether	☐	☐
avalansh	☐	☐
momentarily	☐	☐
ambre	☐	☐
machete	☐	☐
volcanious	☐	☐
lynx	☐	☐
counterclockwise	☐	☐
aqueduct	☐	☐
astronavt	☐	☐
siberian	☐	☐
capybara	☐	☐
mackintosh	☐	☐
yamatai	☐	☐

Block C: I know the meaning of the word

	Yes	No
athanatoi	☐	☐
constellation	☐	☐
chalice	☐	☐
krusifix	☐	☐
ossuary	☐	☐
ekscavate	☐	☐
antlers	☐	☐
fatigs	☐	☐
obsidian	☐	☐
hallucinogenious	☐	☐
uturunku	☐	☐
angar	☐	☐
yaga	☐	☐
thunderclap	☐	☐
stalagmite	☐	☐
zitadel	☐	☐
balustrade	☐	☐
aicicles	☐	☐

cataclysm	☐	☐
cathedral	☐	☐
chuspa	☐	☐
wilderment	☐	☐
constantinople	☐	☐
crustacean	☐	☐
darts	☐	☐

Block D: I know the meaning of the word

	Yes	No
profet	☐	☐
famine	☐	☐
cerpent	☐	☐
dagger	☐	☐
invulnerous	☐	☐
ceramical	☐	☐
enigmaful	☐	☐
frescoes	☐	☐
peruvious	☐	☐

persimmon	☐	☐
regalium	☐	☐
peccary	☐	☐
geolog	☐	☐
macabre	☐	☐
pagan	☐	☐
stalaktit	☐	☐
snowdrift	☐	☐
mongolian	☐	☐
whitch	☐	☐
byzantine	☐	☐
yucatan	☐	☐
soviet	☐	☐
mural	☐	☐
shantytown	☐	☐
yucatec	☐	☐

General background

1. How old are you?

_____

2. What is your gender?

Male ⬭

Female ⬭

Other ⬭

3. What is/are your native language(s)?

_____

4. What language(s) do you speak in your family?

_____

5. What language(s) do you speak with your friends?

_____

6. What language(s) do you speak at work/ university?

_____

7. How many years have you been learning English?

_____

8. How would you rate your English level?

beginner ⬭

pre-intermediate ⬭

intermediate ⬭

upper-intermediate ⬭

advanced ⬭

9. How would you rate your game involvement level?

non-gamer ⬭

casual gamer ⬭

moderate gamer ⬭

hardcore gamer ⬭

The questionnaire is completed.

Appendix B

List of Tables and Figures in Appendix B

Table B 1: Frequency of age distribution across the sample

How old are you?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18	4	14.8	14.8	14.8
	19	2	7.4	7.4	22.2
	20	1	3.7	3.7	25.9
	21	1	3.7	3.7	29.6
	22	2	7.4	7.4	37.0
	25	2	7.4	7.4	44.4
	26	1	3.7	3.7	48.1
	27	1	3.7	3.7	51.9
	28	1	3.7	3.7	55.6
	29	2	7.4	7.4	63.0
	30	1	3.7	3.7	66.7
	32	2	7.4	7.4	74.1
	34	1	3.7	3.7	77.8
	35	1	3.7	3.7	81.5
	37	2	7.4	7.4	88.9
	39	1	3.7	3.7	92.6
	40	1	3.7	3.7	96.3
	50	1	3.7	3.7	100.0
	Total	27	100.0	100.0	

Table B 2: Frequency of native languages distribution across the sample

What is/are your native language(s)?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Arabic	8	29.6	29.6	29.6
	French	1	3.7	3.7	33.3
	German	3	11.1	11.1	44.4
	German/French	1	3.7	3.7	48.1
	Italian	3	11.1	11.1	59.3
	Polish	7	25.9	25.9	85.2
	Spanish	2	7.4	7.4	92.6
	Ukrainian	2	7.4	7.4	100.0
	Total	27	100.0	100.0	

Table B 3: Frequency distribution of the variable *What language(s) do you speak with your friends?*

What language(s) do you speak with your friends?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		1	3.7	3.7	3.7
	Arabic/English	2	7.4	7.4	11.1
	English	6	22.2	22.2	33.3
	English/French	1	3.7	3.7	37.0
	French/English	1	3.7	3.7	40.7
	German	3	11.1	11.1	51.9
	German/English	1	3.7	3.7	55.6
	German/French	1	3.7	3.7	59.3
	Italian	2	7.4	7.4	66.7
	Italian/English	1	3.7	3.7	70.4
	Polish	2	7.4	7.4	77.8
	Polish/English	3	11.1	11.1	88.9
	Russian/English	1	3.7	3.7	92.6
	Spanish/English	2	7.4	7.4	100.0
	Total	27	100.0	100.0	

Table B 4: Frequency distribution of the variable *What language(s) do you speak at work/university?*

What language(s) do you speak at work/ university?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		1	3.7	3.7	3.7
	Arabic/English	3	11.1	11.1	14.8
	English	6	22.2	22.2	37.0
	English/German	1	3.7	3.7	40.7
	French/English	1	3.7	3.7	44.4
	German	2	7.4	7.4	51.9
	German/English	3	11.1	11.1	63.0
	Italian	2	7.4	7.4	70.4
	Italian/English	1	3.7	3.7	74.1
	Polish	2	7.4	7.4	81.5
	Polish/English	2	7.4	7.4	88.9
	Spanish	1	3.7	3.7	92.6
	Spanish/English	1	3.7	3.7	96.3
	Ukrainian	1	3.7	3.7	100.0
	Total	27	100.0	100.0	

Table B 5: Descriptive statistics of the variable *How many years have you been learning English?*

Statistics

How many years have you been learr

N	Valid	26
	Missing	1
Mean		13.88
Std. Deviation		4.633
Skewness		.558
Std. Error of Skewness		.456
Kurtosis		-.088
Std. Error of Kurtosis		.887
Range		18

Table B 6: Descriptive statistics of the variable *How would you rate your English level proficiency*?

Statistics

How would you rate your English leve

N	Valid	27
	Missing	0
Median		4.00
Mode		3
Std. Deviation		.786
Skewness		.350
Std. Error of Skewness		.448
Kurtosis		-1.263
Std. Error of Kurtosis		.872
Range		2

Table B 7: Descriptive statistics of the variable *How would you rate your game involvement*?

Statistics

How would you rate your game involv

N	Valid	27
	Missing	0
Median		3.00
Mode		2
Std. Deviation		.636
Skewness		.594
Std. Error of Skewness		.448
Kurtosis		-.484
Std. Error of Kurtosis		.872
Range		2

Table B 8: Descriptive statistics of the variable *How often do you play Tomb Raider in English*?

Statistics

How often do you play Tomb Raider

N	Valid	27
	Missing	0
Median		3.00
Mode		3
Std. Deviation		1.311
Skewness		.331
Std. Error of Skewness		.448
Kurtosis		-.791
Std. Error of Kurtosis		.872
Range		4

Table B 9: Descriptive statistics of the variable *How many hours do you play Tomb Raider in English per week?*

Statistics

How many hours do you play Tomb R

N	Valid	27
	Missing	0
Median		2.00
Mode		2
Std. Deviation		1.188
Skewness		.825
Std. Error of Skewness		.448
Kurtosis		.046
Std. Error of Kurtosis		.872
Range		4

Table B 10: Crosstabulation of two variables on micro-involvement activities

How often do you interact with other people in a voice chat in English during Tomb Raider gameplay? * How often do you interact with other people in English in a written chat during Tomb Raider gameplay? Crosstabulation

Count

		How often do you interact with other people in English in a written chat during Tomb Raider gameplay?					
		never	rarely	sometimes	often	quite frequently	Total
How often do you interact with other people in a voice chat in English during Tomb Raider gameplay?	never	10	3	2	1	1	17
	rarely	0	3	0	1	0	4
	sometimes	0	1	3	0	0	4
	often	0	0	0	1	1	2
Total		10	7	5	3	2	27

Table B 11: Descriptive statistics of the variable *false alarms*

Descriptives

			Statistic	Std. Error
falsealarms	Mean		15.63	1.905
	95% Confidence Interval for Mean	Lower Bound	11.71	
		Upper Bound	19.55	
	5% Trimmed Mean		15.15	
	Median		14.00	
	Variance		98.011	
	Std. Deviation		9.900	
	Minimum		3	
	Maximum		38	
	Range		35	
	Interquartile Range		13	
	Skewness		.679	.448
	Kurtosis		-.335	.872

Table B 12: Descriptive statistics for the variable *hits*

Descriptives

			Statistic	Std. Error
hits	Mean		42.56	1.712
	95% Confidence Interval for Mean	Lower Bound	39.04	
		Upper Bound	46.07	
	5% Trimmed Mean		42.52	
	Median		42.00	
	Variance		79.103	
	Std. Deviation		8.894	
	Minimum		27	
	Maximum		59	
	Range		32	
	Interquartile Range		16	
	Skewness		.005	.448
	Kurtosis		-1.099	.872

Table B 13: Test of normality for the variable *false alarms*

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
falsealarms	.124	27	.200*	.936	27	.098

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Table B 14: Test of normality for the variable *hits*

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
hits	.136	27	.200*	.963	27	.432

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Table B 15: Descriptive statistics of the variable *Do you think that all you have learnt from digital games is how to play them*?

Statistics

Do you think that all you have learnt fi

N	Valid	27
	Missing	0
Median		2.00
Mode		1
Std. Deviation		1.238
Skewness		1.163
Std. Error of Skewness		.448
Kurtosis		.559
Std. Error of Kurtosis		.872
Range		4
Percentiles	25	1.00
	50	2.00
	75	3.00

Table B 16: Descriptive statistics of the variable *How much do you think Tomb Raider helped you to expand your English vocabulary?*

Statistics

How much do you think Tomb Raider l

N	Valid	27
	Missing	0
Median		3.00
Mode		3
Std. Deviation		.974
Skewness		-.303
Std. Error of Skewness		.448
Kurtosis		.482
Std. Error of Kurtosis		.872
Range		4
Percentiles	25	3.00
	50	3.00
	75	4.00

Table B 17: Crosstabulation of two variables, *How much do you think Tomb Raider helped you to expand your English vocabulary and How would you rate your game involvement level*?

How much do you think Tomb Raider helped you to expand your English vocabulary? * How would you rate your game involvement level? Crosstabulation

Count

		How would you rate your game involvement level?			
		casual gamer	moderate gamer	hardcore gamer	Total
How much do you think Tomb Raider helped you to expand your English vocabulary?	not at all	0	1	0	1
	a little	0	1	0	1
	some help	7	4	1	12
	a lot	3	4	1	8
	immensely	3	2	0	5
Total		13	12	2	27

Table B 18: Frequency distribution of the variable How often do you read Tomb Raider walkthroughs/ or guides in English?

How often do you read Tomb Raider walkthroughs/ or guides in English?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	4	14.8	14.8	14.8
	rarely	1	3.7	3.7	18.5
	sometimes	4	14.8	14.8	33.3
	often	10	37.0	37.0	70.4
	quite frequently	8	29.6	29.6	100.0
	Total	27	100.0	100.0	

Table B 19: Frequency distribution o the variable *How often do you watch Tomb Raider related video content in English?*

How often do you watch Tomb Raider related video content (trailers, previews, etc.) in English?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	1	3.7	3.7	3.7
	rarely	2	7.4	7.4	11.1
	sometimes	8	29.6	29.6	40.7
	often	2	7.4	7.4	48.1
	quite frequently	14	51.9	51.9	100.0
	Total	27	100.0	100.0	

Table B 20: Frequency distribution of the variable *How often do you visit Tomb Raider forums, blogs or websites in English*?

How often do you visit Tomb Raider forums, blogs or websites in English?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	3	11.1	11.1	11.1
	rarely	4	14.8	14.8	25.9
	sometimes	9	33.3	33.3	59.3
	often	4	14.8	14.8	74.1
	quite frequently	7	25.9	25.9	100.0
	Total	27	100.0	100.0	

Table B 21: Frequency distribution of the variable *How often do you contribute to Tomb Raider forums, blogs or websites in English?*

How often do you contribute to Tomb Raider forums, blogs or websites in English?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	9	33.3	33.3	33.3
	rarely	9	33.3	33.3	66.7
	sometimes	6	22.2	22.2	88.9
	often	2	7.4	7.4	96.3
	quite frequently	1	3.7	3.7	100.0
	Total	27	100.0	100.0	

Table B 22: Frequency distribution of the variable *How often do you read news or updates regarding the Tomb Raider franchise in English on the Internet?*

How often do you read news or updates regarding the Tomb Raider franchise in English on the Internet?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	3	11.1	11.1	11.1
	rarely	5	18.5	18.5	29.6
	sometimes	4	14.8	14.8	44.4
	often	7	25.9	25.9	70.4
	quite frequently	8	29.6	29.6	100.0
	Total	27	100.0	100.0	

Table B 23: Frequency distribution of the variable *How often do you read other people's Tomb Raider fan fiction in English?*

How often do you read other people's Tomb Raider fan fiction in English?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	18	66.7	66.7	66.7
	rarely	4	14.8	14.8	81.5
	sometimes	4	14.8	14.8	96.3
	often	1	3.7	3.7	100.0
	Total	27	100.0	100.0	

Table B 24: Frequency distribution of the variable *How often do you write your own Tomb Raider related fan fiction in English?*

How often do you write your own Tomb Raider related fan fiction in English?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	23	85.2	85.2	85.2
	rarely	2	7.4	7.4	92.6
	sometimes	2	7.4	7.4	100.0
	Total	27	100.0	100.0	

Table B 25: Frequency distribution of the variable *How often do you watch Tomb Raider based movies in English*?

How often do you watch Tomb Raider based movies in English?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	3	11.1	11.1	11.1
	rarely	2	7.4	7.4	18.5
	sometimes	9	33.3	33.3	51.9
	often	2	7.4	7.4	59.3
	quite frequently	11	40.7	40.7	100.0
	Total	27	100.0	100.0	

Table B 26: Frequency distribution of the variable *How often do you listen to Tomb Raider related podcasts in English*?

How often do you listen to Tomb Raider related podcasts in English?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	9	33.3	33.3	33.3
	rarely	10	37.0	37.0	70.4
	sometimes	7	25.9	25.9	96.3
	often	1	3.7	3.7	100.0
	Total	27	100.0	100.0	

Table B 27: Frequency distribution of the variable *How often do you cosplay Lara Croft or other Tomb Raider characters in English?*

How often do you cosplay Lara Croft or other Tomb Raider characters referring to resources in English (apps, tutorials, websites, etc.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	19	70.4	70.4	70.4
	rarely	6	22.2	22.2	92.6
	sometimes	2	7.4	7.4	100.0
	Total	27	100.0	100.0	

Table B 28: : Frequency distribution of the variable *How often do you consult external resources in English, such as Wikipedia, maps, Youtube, books, for additional information?*

How often do you consult external resources in English, such as Wikipedia, maps, YouTube, books, for additional information?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	never	4	14.8	14.8	14.8
	sometimes	4	14.8	14.8	29.6
	often	5	18.5	18.5	48.1
	quite frequently	14	51.9	51.9	100.0
	Total	27	100.0	100.0	

Table B 29: Frequencies of false alarms

False alarms	Nana12	UNKWN1	NADA09	UNKN2	UNKN3	MAGI10	ENSH99	CIMU08	BALI09	KACZ02	GRBO04	ADSO06	ARMA07	DAOL03	MASU05	AZTS07	NADA02	SRSG	MOHY07	AHMH	SGTB	BADO	MIHY01	NIKI12	SANO11	SCOV08	NIGR12	TOTAL	TOTAL %
ceramical	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	**24**	**89%**
amulette	1	0	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0	1	1	0	1	**22**	**81%**
alarmly	0	1	1	1	1	0	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	0	0	**20**	**74%**
volcanious	0	1	1	1	0	1	1	1	1	1	1	1	1	0	1	1	1	1	0	1	1	1	1	0	0	0	0	**19**	**70%**
hallucinogenious	0	1	1	0	0	0	1	1	1	1	1	1	1	0	1	1	1	1	0	1	1	1	1	0	0	1	0	**18**	**67%**
phanteon	0	1	1	1	0	1	1	0	1	1	1	1	0	0	1	1	1	0	1	0	1	0	0	1	1	0	1	**17**	**63%**
sarkofag	0	0	0	1	0	0	1	1	1	1	1	1	1		1	1	0	1	1	1	1	1	0	1	1	0	0	**17**	**63%**
fuselarge	0	0	0	1	1	1	1	1	0	0	1	1	1	0	0	1	0	0	1	1	1	1	0	1	0	0	1	**15**	**56%**
hideoutness	0	1	1	1	1	0	1	0	0	0	1	1	1	0	1	1	1	0	1	0	1	1	0	0	0	0	0	**14**	**52%**
katakomb	0	0	1	1	1	0	0	1	0	0	1	0	1	0	1	1	1	1	0	1	1	1	0	0	0	0	0	**13**	**48%**
wilderment	0	1	1	1	1	1	0	0	0	0	1	0	1	0	0	1	1	1	0	1	1	1	0	0	0	0	0	**13**	**48%**
krimson	1	0	1	1	1	1	0	0	0	0	1	1	1	0	0	1	1	0	1	0	0	0	0	0	1	0	0	**12**	**44%**
peruvious	0	0	1	1	1	1	0	0	0	0	1	1	0	0	0	1	1	1	0	1	1	1	0	0	0	0	0	**12**	**44%**
ambre	0	1	0	1	1	1	1	1	0	0	1	0	0	0	0	1	1	0	1	0	0	1	0	0	0	0	0	**11**	**41%**
angar	1	0	1	1	1	0	0	1	0	0	0	0	1	0	0	1	1	0	0	0	0	1	0	1	1	0	0	**11**	**41%**
kathedral	0	0	1	1	1	0	1	1	0	0	1	0	1	0	1	1	1	0	1	0	0	0	0	0	0	0	0	**11**	**41%**
profet	0	0	1	1	1	1	1	1	0	0	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	**10**	**37%**
unwreckage	0	0	0	1	1	1	0	0	1	0	1	0	0	0	0	1	1	0	1	0	0	1	0	0	0	0	0	**9**	**33%**
encampmenting	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	**9**	**33%**
shrain	0	0	0	1	1	0	0	0	0	0	0	1	1	1	1	1	0	0	1	1	0	0	0	0	0	0	0	**9**	**33%**
krusifix	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	1		0	0	0	0	0	0	0	0	0	**9**	**33%**
ekscavate	0	0	1	1	1	0	1	1	0	0	1	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	**9**	**33%**
fatigs	0	0	1	1	1	0	0	0	0	0	1	0	1	0	0	1	0	0	1	0	0	1	0	0	1	0	0	**9**	**33%**
enigmaful	0	0	0	1	1	0	1	0	0	0	1	0	1	0	0	1	0	0	1	0	1	1	0	0	0	0	0	**9**	**33%**
whitch	0	0	1	1	1	0	0	1	0	1	1	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	**9**	**33%**
astronavt	0	0	0	1	1	0	0	1	0	0	1	0	0	0	1	1	1	0	0	0	0	1	0	0	0	0	0	**8**	**30%**
cerpent	0	0	1	1	0	0	0	0	0	1	1	1	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	**8**	**30%**
invulnerous	0	0	0	1	1	0	0	0	0	0	1	0	1	0	0	1	0	0	0	1	1	1	0	0	0	0	0	**8**	**30%**
geolog	0	0	0	0	0	0	0	0	0	1	1	0	1	0	1	1	1	1	0	0	0	1	0	0	0	0	0	**8**	**30%**
zitadel	0	0	1	1	0	0	0	1	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	**7**	**26%**
dessipher	0	0	1	1	0	0	0	1	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	**6**	**22%**
inbush	0	0	0	0	1	0	0	0	0	1	1	0	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	**6**	**22%**
ivesdrop	0	0	1	1	1	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	**6**	**22%**
avalansh	0	0	1	1	0	0	0	0	0	0	1	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	**6**	**22%**
aicicles	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	**6**	**22%**

regalium	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	1	1	0	0	**6**	**22%**
stalaktit	0	0	0	0	1	0	0	1	0	0	1	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	**6**	**22%**
akwatik	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0	0	0	0	1	0	0	0	0	0	**5**	**19%**
dizguize	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	**5**	**19%**
thunderklap	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	**5**	**19%**

Table B 30: Frequency of hits

Hits	Nana12	UNKWN1	NADA09	UNKN2	UNKN3	MAGI10	ENSH99	CIMU08	BALI09	KACZ02	GRBO04	ADSO06	ARMA07	DAOL03	MASU05	ARTS07	NADA02	SRSG	MOHY07	AHMH	SGTB	BADO	MIHY01	NIKI12	SANO11	SCOV08	NIGR12	**TOTAL**	**TOTAL %**
machete	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**27**	**100%**
siberian	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**27**	**100%**
mongolian	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**27**	**100%**
soviet	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**27**	**100%**
jade	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	**26**	**96%**
dagger	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**26**	**96%**
glacier	1	1	1	1	1	1	1	1	1	0	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	**25**	**93%**
obsidian	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	**25**	**93%**
constantinople	1	0	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	**25**	**93%**
darts	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	**25**	**93%**
byzantine	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	**25**	**93%**
constellation	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	0	1	1	1	1	1	1	1	1	**24**	**89%**
snowdrift	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	0	**24**	**89%**
mural	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	**24**	**89%**
shantytown	1	1	0	1	1	1	0	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	**24**	**89%**
monolith	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	1	1	1	1	1	**24**	**88%**
cavern	1	0	1	1	0	1	1	1	1	0	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	**23**	**85%**
scavenger	1	1	1	1	1	1	0	0	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0	1	1	1	**23**	**85%**
edible	1	1	1	1	1	1	1	1	0	0	1	0	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	**23**	**85%**
counterclockwise	1	1	1	1	1	1	1	0	0	0	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	**23**	**85%**
cataclysm	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	1	1	1	1	1	1	**23**	**85%**
himiko	1	0	0	1	0	1	1	0	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	**22**	**81%**
gulag	1	0	1	1	0	1	1	0	1	1	1	1	1	0	1	1	1	1	0	1	1	1	1	1	1	1	1	**22**	**81%**
piranhas	1	0	1	1	0	1	1	1	1	0	1	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	**22**	**81%**
eel	1	1	1	1	1	1	1	0	0	0	0	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	**22**	**81%**
yamatai	1	0	0	1	1	1	0	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1	0	**21**	**78%**
canister	1	1	1	1	0	1	0	0	1	1	1	1	1	1	1	1	1	1	0	1	1	0		1	1	0	1	**20**	**74%**
famine	1	1	1	1	1	1	0	0	0	1	1	0	1	0	0	1	1	1	0	1	1	1	1	1	1	1	1	**20**	**74%**
pagan	1	0	0	0	1	0	1	1	0	0	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	**20**	**74%**
yucatan	1	0	0	0	1	1	1	1	1	0	0	1	0	1	1	1	0	1	1	1	1	1	1	1	1	1	1	**20**	**74%**
paititi	1	0	0	1	0	1	0	0	1	1	1	1	1	1	1	1	0	1	0	1	1	1	0	1	1	1	1	**19**	**70%**
momentarily	1	1	1	1	1	1	1	1	0	0	1	0	0	0	1	1	1	1	0	1	1	1	1	0	0	1	1	**19**	**70%**
lynx	1	1	1	1	1	1	1	0	0	0	0	1	1	1	0	0	1	1	0	1	1	0	1	1	1	1	1	**19**	**70%**
aquduct	1	0	1	1	1	1	0	1	1	1	1	1	1	1	1	0	1	0	0	0	0	0	1	1	1	1	1	**19**	**70%**
kukulkan	1	0	0	1	1	1	0	0	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	0	1	0	0	**18**	**67%**
cozumel	1	0	0	0	0	1	0	1	1	1	1	1	1	0	1	1	0	1	0	1	1	1	1	1	1	0	1	**18**	**67%**
capybara	1	0	1	0	0	1	0	0	1	1	0	0	1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	**18**	**67%**

mackintosh	1	1	1	1	1	0	1	1	0	1	0	1	1	0	0	1	1	0	1	1	1	0	0	1	1	0	1	**18**	**67%**
chalice	1	0	1	1	0	1	1	1	1	0	1	0	1	0	1	1	1	0	0	1	1	1	0	1	1	0	1	**18**	**67%**
stalagmite	1	0	0	1	0	1	0	1	1	0	1	1	0	1	1	1	0	0	0	1	1	1	1	1	1	1	1	**18**	**67%**
effigy	1	1	0	1	0	1	1	1	0	0	1	0	1	0	0	1	1	1	0	1	1	1	0	1	1	0	1	**17**	**63%**
incense	1	0	1	1	1	0	1	1	0	0	1	0	1	0	0	1	1	1	1	1	1	1	0	1	0	0	1	**17**	**63%**
ossuary	1	0	0	1	0	1	1	1	1	1	1	0	0	1	0	0	1	1	0	1	1	1	0	1	1	0	1	**17**	**63%**
yaga	1	0	1	1	0	1	0	1	1	0	1	1	1	0	0	1	1	0	0	0	1	1	0	1	1	1	1	**17**	**63%**
macabre	1	0	0	0	0	1	1	1	1	1	1	1	1	0	1	1	0	0	0	1	1	1	0	1	1	0	1	**17**	**63%**
tether	1	1	1	1	0	1	0	0	0	0	1	0	1	0	0	1	1	1	0	1	1	1	0	1	1	0	1	**16**	**59%**
trebuchet	1	0	0	1	0	1	0	0	1	1	1	0	1	0	0	1	0	1	0	1	1	1	0	1	1	0	1	**15**	**56%**
yucatec	1	0	0	0	1	1	0	1	0	0	0	0	0	0	1	1	0	1	1	1	1	1	0	1	1	1	1	**15**	**56%**
kitezh	1	0	0	0	0	1	0	0	1	1	1	1	1	0	1	1	0	0	0	1	0	1	0	1	1	0	1	**14**	**52%**
antlers	1	1	1	1	1	0	0	0	0	0	1	0	1	1	0	1	1	1	0	1	1	0	0	0	1	0	0	**14**	**52%**
balustrade	1	0	0	1	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	1	0	1	**14**	**52%**
frescoes	1	0	0	1	0	1	0	0	0	0	1	1	0	1	1	1	0	0	0	1	0	1	0	1	1	0	1	**13**	**48%**
quechua	1	0	0	1	0	1	0	0	0	1	0	1	1	0	0	1	0	1	0	1	1	0	1	0	0	1	0	**12**	**44%**
ziggurat	1	0	0	0	0	1	1	0	1	0	0	1	0	1	1	1	0	0	0	0	0	1	0	1	1	0	1	**12**	**44%**
crustacean	1	0	1	1	0	0	1	0	0	0	1	0	0	0	0	1	1	0	0	0	0	1	1	0	1	1	1	**12**	**44%**
chuspa	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	1	1	0	1	0	0	1	**9**	**33%**
persimmon	1	1	0	1	0	0	1	0	0	0	0	0	1	0	1	1	0	0	1	0	0	0	0	0	1	0	0	**9**	**33%**
peccary	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	1	1	0	1	1	0	1	**9**	**33%**
uturuncu	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0	0	1	0	0	**7**	**26%**
athanatoi	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	**2**	**7%**

Table B 31: Correlation of the micro- and macro-level activities and the variable *testscore*

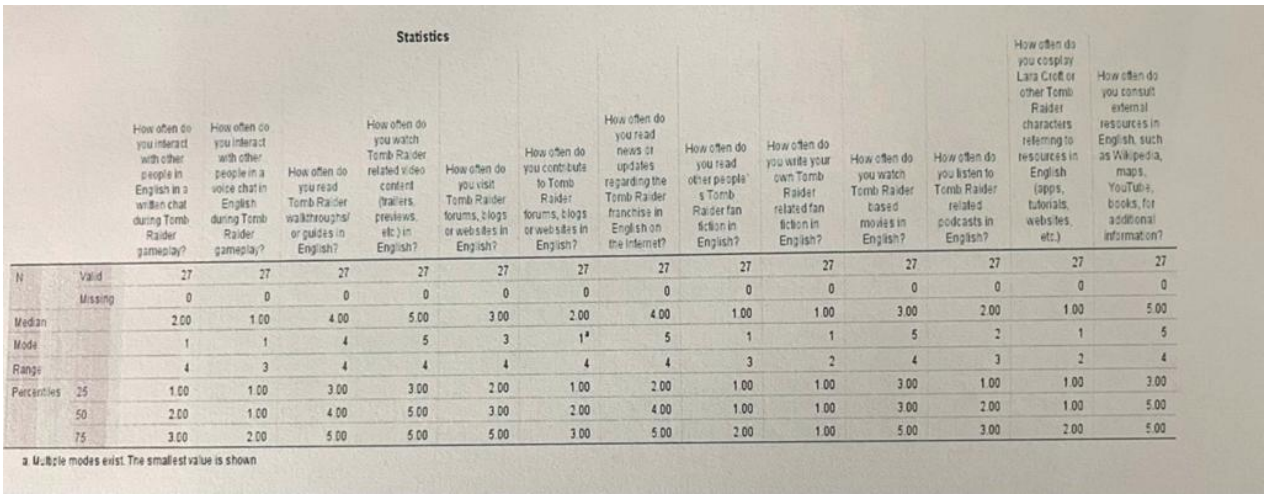
Correlations

			How often do you interact with other people in English in a written chat during Tomb Raider gameplay?	How often do you interact with other people in a voice chat in English during Tomb Raider gameplay?	How often do you read Tomb Raider walkthroughs / or guides in English?	How often do you watch Tomb Raider related video content (trailers, previews, etc.) in English?	How often do you visit Tomb Raider forums, blogs or websites in English?	How often do you contribute to Tomb Raider forums, blogs or websites in English?	How often do you read news or updates regarding the Tomb Raider franchise in English on the Internet?	How often do you read other people's Tomb Raider fan fiction in English?	How often do you write your own Tomb Raider related fan fiction in English?	How often do you watch Tomb Raider based movies in English?	How often do you listen to Tomb Raider related podcasts in English?	How often do you cosplay Lara Croft or other Tomb Raider characters referring to resources in English (apps, tutorials, websites, etc.)	How often do you consult external resources in English, such as Wikipedia, maps, YouTube, books, for additional information?	testscore
Spearman's rho	How often do you interact with other people in English in a written chat during Tomb Raider gameplay?	Correlation Coefficient	1.000	.559**	.128	.319	.451*	.452*	.251	.634**	.265	-.051	.352	.042	.243	.125
		Sig. (2-tailed)	.	.002	.526	.105	.018	.018	.207	.000	.181	.801	.072	.834	.222	.535
		N	27	27	27	27	27	27	27	27	27	27	27	27	27	27
	How often do you interact with other people in a voice chat in English during Tomb Raider gameplay?	Correlation Coefficient	.559**	1.000	-.124	-.010	.062	.348	-.123	.384*	.232	.193	.257	.408*	.318	.202
		Sig. (2-tailed)	.002	.	.539	.960	.759	.075	.541	.048	.244	.335	.195	.035	.107	.313
		N	27	27	27	27	27	27	27	27	27	27	27	27	27	27
	How often do you read Tomb Raider walkthroughs/ or guides in English?	Correlation Coefficient	.128	-.124	1.000	.271	.478*	.016	.260	-.099	-.032	-.075	.054	-.097	.525**	-.117
		Sig. (2-tailed)	.526	.539	.	.172	.012	.935	.191	.625	.872	.708	.788	.629	.005	.562
		N	27	27	27	27	27	27	27	27	27	27	27	27	27	27
	How often do you watch Tomb Raider related video content (trailers, previews, etc.) in English?	Correlation Coefficient	.319	-.010	.271	1.000	.614**	.635**	.832**	.265	.380	.133	.096	.179	.224	.313
		Sig. (2-tailed)	.105	.960	.172	.	.001	.000	.000	.181	.051	.507	.633	.372	.261	.112
		N	27	27	27	27	27	27	27	27	27	27	27	27	27	27
	How often do you visit Tomb Raider forums, blogs or websites in English?	Correlation Coefficient	.451*	.062	.478*	.614**	1.000	.469*	.669**	.230	.399*	-.098	.274	.040	.293	.068
		Sig. (2-tailed)	.018	.759	.012	.001	.	.013	.000	.248	.039	.626	.167	.843	.138	.736
		N	27	27	27	27	27	27	27	27	27	27	27	27	27	27
	How often do you contribute to Tomb Raider forums, blogs or websites in English?	Correlation Coefficient	.452*	.348	.016	.635**	.469*	1.000	.570**	.270	.404*	.025	.147	.124	.263	.350
		Sig. (2-tailed)	.018	.075	.935	.000	.013	.	.002	.173	.037	.903	.466	.539	.186	.073
		N	27	27	27	27	27	27	27	27	27	27	27	27	27	27
	How often do you read news or updates regarding the Tomb Raider franchise in English on the Internet?	Correlation Coefficient	.251	-.123	.260	.832**	.669**	.570**	1.000	.320	.426*	.061	.350	.110	.162	.235
		Sig. (2-tailed)	.207	.541	.191	.000	.000	.002	.	.104	.027	.764	.073	.587	.420	.239
		N	27	27	27	27	27	27	27	27	27	27	27	27	27	27
	How often do you read other people's Tomb Raider fan fiction in English?	Correlation Coefficient	.634**	.384*	-.099	.265	.230	.270	.320	1.000	.456*	.167	.366	.288	.085	.379
		Sig. (2-tailed)	.000	.048	.625	.181	.248	.173	.104	.	.017	.405	.060	.146	.673	.051
		N	27	27	27	27	27	27	27	27	27	27	27	27	27	27
	How often do you write your own Tomb Raider related fan fiction in English?	Correlation Coefficient	.265	.232	-.032	.380	.399*	.404*	.426*	.456*	1.000	.196	.333	.445*	-.013	.051
		Sig. (2-tailed)	.181	.244	.872	.051	.039	.037	.027	.017	.	.327	.090	.020	.950	.799
		N	27	27	27	27	27	27	27	27	27	27	27	27	27	27
	How often do you watch Tomb Raider based movies in English?	Correlation Coefficient	-.051	.193	-.075	.133	-.098	.025	.061	.167	.196	1.000	.019	.324	.314	.496**
		Sig. (2-tailed)	.801	.335	.708	.507	.626	.903	.764	.405	.327	.	.925	.100	.110	.009
		N	27	27	27	27	27	27	27	27	27	27	27	27	27	27
	How often do you listen to Tomb Raider related podcasts in English?	Correlation Coefficient	.352	.257	.054	.096	.274	.147	.350	.366	.333	.019	1.000	.330	.258	.041
		Sig. (2-tailed)	.072	.195	.788	.633	.167	.466	.073	.060	.090	.925	.	.093	.195	.839
		N	27	27	27	27	27	27	27	27	27	27	27	27	27	27
	How often do you cosplay Lara Croft or other Tomb Raider characters referring to resources in English (apps, tutorials, websites, etc.)	Correlation Coefficient	.042	.408*	-.097	.179	.040	.124	.110	.288	.445*	.324	.330	1.000	.110	-.058
		Sig. (2-tailed)	.834	.035	.629	.372	.843	.539	.587	.146	.020	.100	.093	.	.585	.775
		N	27	27	27	27	27	27	27	27	27	27	27	27	27	27
	How often do you consult external resources in English, such as Wikipedia, maps, YouTube, books, for additional information?	Correlation Coefficient	.243	.318	.525**	.224	.293	.263	.162	.085	-.013	.314	.258	.110	1.000	.331
		Sig. (2-tailed)	.222	.107	.005	.261	.138	.186	.420	.673	.950	.110	.195	.585	.	.092
		N	27	27	27	27	27	27	27	27	27	27	27	27	27	27
	testscore	Correlation Coefficient	.125	.202	-.117	.313	.068	.350	.235	.379	.051	.496**	.041	-.058	.331	1.000
		Sig. (2-tailed)	.535	.313	.562	.112	.736	.073	.239	.051	.799	.009	.839	.775	.092	.
		N	27	27	27	27	27	27	27	27	27	27	27	27	27	27

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table B 32: Table of central tendency for micro- and macro- level activities (scanned copy)



Statistics

		How often do you interact with other people in English in a written chat during Tomb Raider gameplay?	How often do you interact with other people in a voice chat in English during Tomb Raider gameplay?	How often do you read Tomb Raider walkthroughs/ or guides in English?	How often do you watch Tomb Raider related video content (trailers, previews, etc.) in English?	How often do you visit Tomb Raider forums, blogs or websites in English?	How often do you contribute to Tomb Raider forums, blogs or websites in English?	How often do you read news or updates regarding the Tomb Raider franchise in English on the Internet?	How often do you read other people's Tomb Raider fan fiction in English?	How often do you write your own Tomb Raider related fan fiction in English?	How often do you watch Tomb Raider based movies in English?	How often do you listen to Tomb Raider related podcasts in English?	How often do you cosplay Lara Croft or other Tomb Raider characters referring to resources in English (apps, tutorials, websites, etc.)	How often do you consult external resources in English, such as Wikipedia, maps, YouTube, books, for additional information?
N	Valid	27	27	27	27	27	27	27	27	27	27	27	27	27
	Missing	0	0	0	0	0	0	0	0	0	0	0	0	0
Median		2.00	1.00	4.00	5.00	3.00	2.00	4.00	1.00	1.00	3.00	2.00	1.00	5.00
Mode		1	1	4	5	3	1[a]	5	1	1	5	2	1	5
Range		4	3	4	4	4	4	4	3	2	4	3	2	4
Percentiles	25	1.00	1.00	3.00	3.00	2.00	1.00	2.00	1.00	1.00	3.00	1.00	1.00	3.00
	50	2.00	1.00	4.00	5.00	3.00	2.00	4.00	1.00	1.00	5.00	3.00	2.00	5.00
	75	3.00	2.00	5.00	5.00	5.00	3.00	5.00	2.00	1.00	5.00	3.00	2.00	5.00

a. Multiple modes exist. The smallest value is shown

Figure B 1: Frequency distribution of the variable *Do you think that all you have learnt from Tomb Raider is how to play it?*

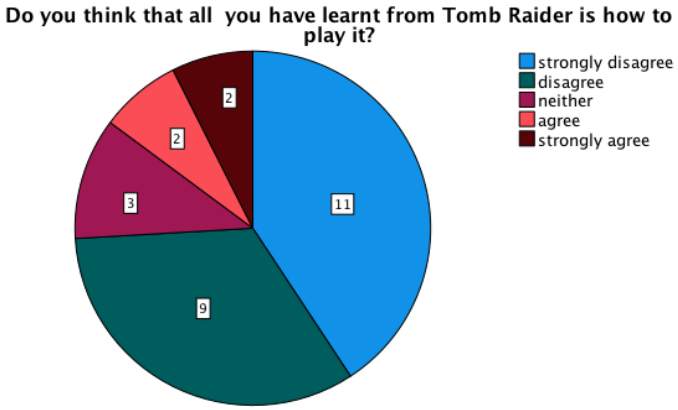
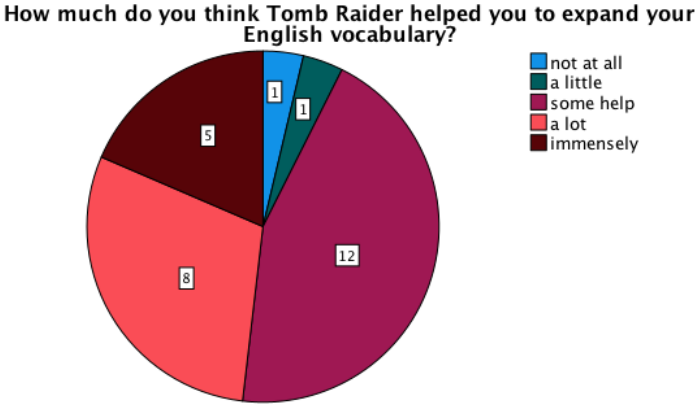


Figure B 2: How much do you think Tomb Raider helped you to expand your English vocabulary?



Deutschsprachiges Abstract

Digitales Spielen als außerschulische Beschäftigung mit Englisch ist ein Schwerpunkt der aufkommenden akademischen Forschung, die das Potenzial von Videospielen für das informelle Englischlernen untersucht. Die vorliegende Masterarbeit zielt darauf ab, die Mechanismen zu entdecken, die für den rezeptiven englischen Wortschatzerwerb durch Spiele verantwortlich sind. Angesichts der zahlreichen Studien im Bereich des außerschulischen Englisch, die überwiegend Massively Multiplayer Online Role-Playing Games (MMORPGs) hervorheben, konzentriert sich dieser Studie auf das Third-Person-Spiel, insbesondere die Tomb Raider-Trilogie.

Die Studie nähert sich der Vielfalt der Mikro- und Makro-Involvement-Aktivitäten des Spiels mit dem Ziel, die Beziehung zwischen der Häufigkeit der Expositionen und der Erweiterung des englischen Vokabulars zu untersuchen. Daher werden in der Forschung mehrere methodische Instrumente wie ein Tomb Raider Walkthroughs-Korpus, ein Online-Fragebogen und ein Ja/Nein-Wortschatztest eingesetzt. Die detaillierten Einblicke und Ergebnisse basieren auf den verschiedenen statistischen Berechnungen und Analysen von SPSS.

Die Schlussfolgerungen sollen für Experten und Expertinnen auf dem Gebiet des Englischlernens und -lehrens informativ sein. Die Ergebnisse könnten auch das Interesse der breiten Öffentlichkeit wecken, da digitales Spielen als facettenreiche Exposition den Menschen hilft, mit Freunden und Familie in Verbindung zu bleiben. Noch dazu schlägt das digitale Spielen auch verschiedene Dimensionen für das Erlernen der englischen Sprache vor.