Categorization of Digital Games in English Language Learning Studies: Introducing the SSI Model

Pia Sundqvist[1]

Abstract. The main aim of the present paper is to introduce a model for digital game categorization suitable for use in English language learning studies: the Scale of Social Interaction (SSI) Model (original idea published as Sundqvist, 2013). The SSI Model proposes a classification of commercial off-the-shelf (COTS) digital games into three categories: singleplayer (the smallest scale), multiplayer, and massively multiplayer online games (MMOs, the largest scale). The potential for naturalistic learning (Benson, 2011) of English is hypothesized to be greater the larger the scale of in-game social interaction. A secondary aim is to present preliminary findings regarding the validation of the SSI Model based on data collected from Swedish learners (9th grade) in an ongoing 3-year study about the relation between out-of-school digital gameplay and vocabulary acquisition. The results reveal, for example, that it is more common that learners who play games frequently play multiplayer games and/or MMOs than singleplayer games. Moreover, the results provide partial evidence of the validity of the SSI Model in that the learners who are categorized as playing multiplayer games and MMOs score higher on two vocabulary tests than the learners categorized as playing singleplayer games.

Keywords: CALL, computer games, digital games, COTS, MMO, vocabulary acquisition, naturalistic learning, ESL, EFL, social interaction, self-assessment.

1.   Introduction

Over the years, a number of ways of categorizing digital games have been suggested. Game categorization is necessary for researchers who are interested

---

1. Karlstad University, Faculty of Arts and Social Sciences, Karlstad, Sweden; pia.sundqvist@kau.se

in exploring the relations between digital gameplay and language learning. However, within the gaming industry, there is little consensus about how to classify games (Apperley, 2006; Dickey, 2006; Harteveld & Bekebrede, 2011).

Likewise, I have found it difficult to find an approach for categorization within the broad field of second language acquisition, even though some models have been proposed (e.g. deHaan, 2005; Greenberg, Sherry, Lachlan, Lucas, & Holmstrom, 2010; Kinzie & Joseph, 2008). Kinzie and Joseph (2008), for instance, bring forward six activity modes (active, explorative, problem-solving, strategic, social, and creative) to describe digital gameplay. In all these, a game such as *World of Warcraft* ends up being classified into several modes/genres. This makes analytical procedures complex, especially if a quantitative method is adopted.

In the SSI Model, a game taxonomy that springs from one single mode/axis is used, namely the scale of the social interaction in the game, which is directly linked to the number of players simultaneously involved in playing the game (for a detailed description, see Sundqvist, 2013). The present paper aims to introduce the SSI Model to CALL researchers and to present some preliminary findings regarding its validation.

2.   Method

2.1.   Participants and materials

This article is based on data collected during the first year of an ongoing 3-year study (2011–2014) about the relation between extramural English (Sundqvist, 2009, 2011) and vocabulary acquisition among Swedish 15- and 16-year-olds (N = 280). More specifically, the focus is on one extramural/out-of-school activity: digital gameplay.

Several sets of data are collected each school year, including a questionnaire, two vocabulary tests (shortened versions of the Productive Levels Test and the Vocabulary Levels Test, Laufer & Nation, 1999; Nation, 2001), and the school leaving certificate. The questionnaire provides information about the participants' first language, computer habits in English (e.g. digital gameplay activity: time played and types of games played), speaking anxiety, beliefs about language learning, and self-assessed English ability. The Productive Levels Test (PLT) is taken in the fall semester and the Vocabulary Levels Test (VLT) in the spring. For the present paper, questionnaire data about digital gaming habits are used along with data from the vocabulary tests.

2.2. Design

The sample was divided into five groups depending on their responses to a questionnaire item that asked about how frequently the learners played digital games and also about example(s) of game title(s). Brief group descriptions are provided in Table 1. In Table 2, the distribution of learners in groups 2–5 are cross-tabulated with the frequency of gameplay (χ^2 = 344.538, df = 12, p = .000, φ_c = .650; see Analytic procedure). For validation of the SSI Model, the non-gamers in group 1 are irrelevant and, therefore, excluded.

Table 1. Five groups based on frequency of gameplay
and provision of game title(s)

Group		N	%
1.	Non-gamers	108	38.6
2.	Gamers who do not provide any game title(s)	22	7.9
3.	Gamers who provide only singleplayer game title(s)	31	11.1
4.	Gamers who provide multiplayer game title(s) and possibly also singleplayer game title(s), but no massively multiplayer game title(s)	82	29.3
5.	Gamers who provide massively multiplayer game title(s) and possibly also singleplayer and multiplayer game title(s)	29	10.4
	Missing	8	2.9
Total		**280**	**100**

Table 2. Distribution of learners across groups 1–5
compared with frequency of gameplay (hours per week)*

Frequency of digital gameplay	Group 1 "Non-gamers"	Group 2 "No title given"	Group 3 "Singleplayer"	Group 4 "Multiplayer"	Group 5 "Massively multiplayer"	Total
0 hrs/w	108	1	0	1	0	110
< 3 hrs/w	0	10	19	14	3	46
3–9 hrs/w	0	10	11	23	8	52
> 9 hrs/w	0	1	1	44	18	64
Total	**108**	**22**	**31**	**82**	**29**	**272**
*Three cells (15.0%) have expected count less than 5.						

2.3. Analytic procedure

To compute significance and effect sizes for tests with numeric variables, one-way analysis of variance (ANOVA) together with classical eta squared (η^2) was used. In line with Cohen's (1988) convention for r^2, η^2 = .01 is a small effect size, η^2 = .06 is medium, and η^2 = .14 is large (Dörnyei, 2007). Gabriel's post-hoc test was used to examine which groups differed from which within the

general between-groups differences. Due to the uneven distribution of learners across the groups, Gabriel's test was preferred over, for example, S-N-K. To compute significance and effect sizes for tests with nominal variables, Pearson's chi-squared (χ^2) and Cramér's (1946) V (φ_c) were used. In line with Cohen's (1988) convention for *d* which is also often used for Cramér's V, φ_c = .2 is a small effect size, φ_c = .5 is medium, and φ_c = .8 is large (Aron, Aron, & Coups, 2005).

3.   Results

Internal consistency measures showed that the PLT and VLT were reliable (*r* = .778, *p* = .000; Cronbach's α = .777). Results for both tests are shown in Table 3. Group 4 scored the highest on the PLT, followed by Group 5, 3, and 1. Analysis of variance indicated that there was no significant difference of mean scores among the groups (*F*(3, 155) = 1.59, *p* = .193). For the VLT, again Group 4 scored the highest, and the other groups followed as for the PLT. ANOVA indicated that there was a significant difference of mean scores among the four groups for the VLT (*F*(3, 147) = 3.61, *p* = .015). Gabriel's post-hoc test showed that the score for Group 2 was different from Group 4 (*p* = .005), but that the remaining group comparisons were indistinguishable from one another. Finally, effect sizes were small for the PLT, a test of productive vocabulary size (η^2 = .030), and medium for the VLT, a test of receptive vocabulary size (η^2 = .069).

Although the scores for the non-gamers (Group 1) are irrelevant for the validation of the SSI Model, they are relevant from the perspective of the relation between digital gameplay and vocabulary acquisition and, therefore, provided in Table 4.

Table 3.   PLT and VLT scores for groups 2–5

	Group 2 "No title given"	Group 3 "Singleplayer"	Group 4 "Multiplayer"	Group 5 "Massively multiplayer"	Significance Effect size
PLT (max: 45)					
mean	14.90	18.65	20.19	18.79	
SD	9.00	10.00	10.51	8.50	*p* = .193
n	21	31	79	28	η^2 = .030
VLT (max: 90)					
mean	48.86	59.42	63.64	61.96	
SD	18.67	18.50	18.50	19.86	*p* = .015
n	22	31	75	23	η^2 = .069

Table 4. Scores for Group 1 on the vocabulary tests

	PLT (max: 45)	VLT (max: 90)
mean	16.26	55.99
SD	9.00	17.71
n	105	102

4. Discussion

Based on sociocultural theory (Vygotsky, 1978), the SSI Model proposes a classification of commercial off-the-shelf digital games into three categories: singleplayer, multiplayer, and massively multiplayer online games. As argued in Sundqvist (2013), the potential for naturalistic learning (Benson, 2011) of English is hypothesized to be greater the larger the scale of the in-game social interaction. In other words, the larger the scale of social interaction offered by particular games, the higher the chances of encountering co-players of different nationalities, making the need for a shared language (i.e. English) for in-game interactions obvious. Subsequently, the more authentic English interactions there are, the higher the chances for naturalistic language learning to occur. The scale of social interaction is viewed as a continuum, from small scale (singleplayer games) to large scale (MMOs). From the perspective of language learning, the SSI Model suggests that MMOs are more beneficial than multiplayer games which, in turn, are more beneficial than singleplayer games.

The results reveal that it is more common that learners who play games frequently play multiplayer games and/or MMOs. Further, the results provide partial evidence of the validity of the SSI Model in that the learners categorized into Groups 4 and 5 score higher than Groups 3 and 2.

5. Concluding remarks

This study provides evidence for partial validation of the SSI Model. It was not possible to verify that learners categorized as playing MMOs (Group 5) score significantly higher than learners categorized as playing multiplayer games (Group 4) but, on the other hand, as hypothesized, learners categorized as playing singleplayer games (Group 3) nevertheless scored lower than both Groups 4 and 5, and the lowest scores were found among learners who failed to provide any game titles (Group 2). Upon completion of the 3-year study, which should include a sample of around 1,000 learners, final validation of the SSI Model can be made.

References

Apperley, T. H. (2006). Genre and game studies: Toward a critical approach to video game genres. *Simulation & Gaming, 37*(1), 6-23. doi:10.1177/1046878105282278

Aron, A., Aron, E. N., & Coups, E. J. (2005). *Statistics for the behavioral and social sciences: A brief course* (3rd ed.). London: Prentice Hall International.

Benson, P. (2011). *Teaching and researching autonomy* (2nd ed.). Harlow: Pearson Education.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). New Jersey: Lawrence Erlbaum.

Cramér, H. (1946). *Mathematical methods of statistics*. Princeton: Princeton University Press.

deHaan, J. (2005). Learning language through video games: A theoretical framework, an evaluation of game genres and questions for future research. In S. P. Schaffer & M. L. Price (Eds.), *Interactive convergence: critical issues in multimedia* (pp. 229-239). Oxford: Interdisciplinary Press.

Dickey, M. D. (2006). Game design narrative for learning: Appropriating adventure game design narrative devices and techniques for the design of interactive learning environments. *Educational Technology Research & Development, 54*(3), 245-263. doi: 10.1007/s11423-006-8806-y

Dörnyei, Z. (2007). *Research methods in applied linguistics*. Oxford: Oxford University Press.

Greenberg, B. S., Sherry, J., Lachlan, K., Lucas, K., & Holmstrom, A. (2010). Orientations to video games among gender and age groups. *Simulation & Gaming, 41*(2), 238-259. doi: 10.1177/1046878108319930

Harteveld, C., & Bekebrede, G. (2011). Learning in single- versus multiplayer games: The more the merrier? *Simulation & Gaming, 42*(1), 43-63. doi: 10.1177/1046878110378706

Kinzie, M. B., & Joseph, D. R. D. (2008). Gender differences in game activity preferences of middle school children: implications for educational game design. *Educational Technology Research and Development, 56*(5/6), 643-663. doi: 10.1007/s11423-007-9076-z

Laufer, B., & Nation, P. (1999). A vocabulary-size test of controlled productive ability. *Language Testing, 16*(1), 33-51. doi: 10.1177/026553229901600103

Nation, P. (2001). *Learning vocabulary in another language*. Cambridge: Cambridge University Press.

Sundqvist, P. (2009). *Extramural English matters: Out-of-school English and its impact on Swedish ninth graders' oral proficiency and vocabulary*. PhD, Karlstad University, Karlstad.

Sundqvist, P. (2011). A possible path to progress: Out-of-school English language learners in Sweden. In P. Benson & H. Reinders (Eds.), *Beyond the language classroom* (pp. 106-118). Basingstoke: Palgrave Macmillan.

Sundqvist, P. (2013). The SSI Model: Categorization of digital games in EFL studies. *European Journal of Applied Linguistics and TEFL, 1*(3), 89-104.

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes.* Cole, M., John-Steiner, V., Scribner, S., & Souberman, E. (Eds.). Cambridge, MA: Harvard University Press.