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Investigating Pedagogical Digital Game-based Phrasal Verb Learning Formally vs. Informally among Iranian EFL Learners

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Abstract

The present study investigated formal versus informal implementation of pedagogical digital games to improve phrasal verb knowledge. One hundred and one intermediate students took part in this mixed-method, quasi-experimental research. The sample was divided into two treatment groups. ANCOVA was used for quantitative data analysis. Qualitative data analysis was based on students' questionnaire data. The results revealed that digital game play for 6 weeks within formal classroom setting outperformed informal learning where students had to apply their extended degree of autonomous play and the relevant skills. The mean score difference is 3.45. The majority of students from formal and informal groups prefer formal context of learning. Interaction with peers is more productive between peers, higher levels of satisfaction when they encountered difficulties and significantly constructive in the formal context. Moreover, contrary to previous findings, no significant difference was found between Post Literal and Post Figurative mean scores. Thus both literal and figurative phrasal verb categories improve evenly in a digital game play context and it fosters the interpretation of the previously difficult to comprehend figurative verbs in traditional learning context and mean score for play was considerably higher in formal group and performed better compared to the informal game group.

Keywords: Digital Game-based Language Learning, Figurative, Literal, Mobile Apps, Phrasal Verb

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1. Introduction

Little is known about game play and how it differs between formal and informal settings worldwide. When playing digital games for entertainment or leisure, players can freely explore the game's environment and game play strategies; when playing as part of a class or as an organized event, external goals and instructions may influence how players approach the game (Binzak, Anderson, Kumar, Jordan-Douglas, & Berland, 2016). Meanwhile, in previous studies 'Formal' gameplay data was collected with a structured curriculum. However, 'Informal' gameplay occurred anytime outside of the classroom sessions, including free-play and while playing at home. Overall, in few previous studies comparisons did not reveal significant differences between formal and informal play. Against our predictions, the surprising similarities between formal and informal gameplay in the data present interesting observations regarding how digital games in different cultures are integrated into formal versus informal learning settings.

Most studies on language learning analyse the features and potentials of the digital games. A few researchers and practitioners in education have studied and elicited the language learner's use and experiences respectively (DeHaan, 2005a; Herselman & Technikon, 2000; Yip & Kwan, 2006). Moreover, studies on the design of virtual game foundation and digitalized tools provide an authentic context for cooperative language learning purposes (Morton & Jack, 2005; Pasero & Sabatier, 1998; Johnson, Vilhjalmsson, & Marshella, 2005). Ang & Zaphiris (2007) emphasize on two aspects of digital games in second language learning: virtual game features and cooperative basis for learning. In addition, the majority of people are playing more computer games with increasing play time (Stanley & Mawer, 2008). The new opportunities to re-evaluate what we already know about language learning, and trying to use the advantages of digital game play for the benefits of English language learning are emphasized as significantly important. Informal learning, according to Sefton-Green (2004) can take place in different locations and various collaborative settings. Playing digital games enhances and promotes learning where many schools are unable to implement the learning content by doing. Therefore, whether blending informal and formal contexts of learning can foster language knowledge and promote results is the purpose of conducting the current research.

Implementing electronic games into instructed language learning curriculum requires practical and pedagogical research on game type selection and creation; gamifying, integrating as well as implementing gamefulness to second language learning and their relevant tasks into the teaching instruction and course planning (Godwin-Jones, 2014). In order to investigate these problems not only as a fundamental requirement for making games productive in classroom, but also educate the design, progress and

betterment of games, analysis and collection of shared data from digital games is a major challenge. However, some recent technical developments such as experimental research may present new opportunities.

The most fundamental distinction required to integrate relevant digital games in the setting of how to integrate game play is formal versus informal learning. So far, the attention mostly has been on informal context of learning, i.e. activities related to daily leisure time and played as a routine in which language learning is unconsciously acquired and learning is not the initial focus of the players involved (Sefton-Green, 2006; Tissot, 2004). In this light, it is truly safe to mention that game as a phenomenon has a significant role in education. Thus, those who take part in the game activities might not have the educational agenda during the process but consider it as 'the game's the thing'. This is revealed by student's survey questionnaire results in which many of the participants pointed that they are willing to play and use overtly educational digital games in an informal setting (Dunwell, Freitas, & Jarvis, 2011). Moreover, the most fundamental features of a good game are playability and engagement to consider them as practically efficient kinds of games, without considering their educational objectives. Therefore, what to expect is an important aspect of the future studies for design, implementing and development.

Thus there are three research questions for this study, as the formal versus informal pedagogical digital game play and avoidance of phrasal verb knowledge has never been investigated in Iran and as follows:

1. Does playing digital game formally versus informally have any impact in developing phrasal verb knowledge and motivation?
2. Do attitudes of player-learners vary according to formal vs. informal approach?
3. Does digital game play promote student's intake of phrasal verb categories (Literal vs. Figurative) evenly, equally and categorically?

2. Literature Review

Reinhardt, Warner and Lange (2014) have done a study on new literacies and pilot implementation, in the classroom, while Chik (2014) as part of a leisure activity was conducted out of the class or a different study by Binzak et al. (2016) conducted a simulation game research formally vs. informally. Thus literature review shows that there is no agreement on how to implement a game and whether it should be implemented formally vs. informally specially in an Iranian context.

Moreover, using digital games for second language learning purpose and exploring player-learners' perception and relying on feedback from

digital games as the only source of instruction, although was found to be generally practical and learners enjoyed the feedback designed within the pedagogical game, but learners did not consider the game alone to be significantly useful and sufficient for the pedagogical language learning purposes (Cornillie, Thorne, & Desmet, 2012).

As Gramegna (2018) considers formal education as the instruction and teaching that occurs inside a structured school and a fixed place and time such as a classroom with fixed goals, assessed by foreseeing evaluations and examinations. Thus, formal education consists of structured, intentional, systematic and goal-oriented activities organized to foster learning processes based on students' needs and whenever teachers want them. On the other hand, informal education is based on unconscious and unintentional, naturally occurring acquisition that does not require a fixed timetable and can happen any time without any support from school or interference of any method. It can take place alone or in cooperation with others, often for the core purpose of enjoyment alone. Moreover, the Commission of the European Communities define informal learning as activities that result from our daily routine that may be work, leisure or family related. The learning objectives initially is not for serious learning and therefore not structured. It does not lead to certification and it is mostly incidental and random.

2.1. Phrasal Verb Typology

Phrasal verb has a distinctive role especially in everyday, causal speech in order to convey meaning. Few studies on phrasal verb knowledge (Dagut & Laufer, 1985; Hulstijn & Marchena, 1989; Laufer & Elliasson, 1993; Liao & Fukuya, 2004) revealed that some second language learners, avoid conveying their message using phrasal verbs or even unable to comprehend them in communication. The research results revealed that the learning condition, learning context and student's first language structure in contrast with the target language play significant role for this avoidance.

According to Ghabanchi and Goudarzi (2012) Iranian English language learners avoid phrasal verbs and the findings reveal that majority of students have difficulty obtaining the relevant knowledge. Contrastive Analysis (CA) can explain the complexness of teaching phrasal verb knowledge to language learners worldwide. The main assumptions of CA are: a. the inference of first with second language that can cause the difficulty b. these difficulties can be predicted by comparing L1, L2 usage and c. the effect of inference and impact of first language can be facilitated through teaching materials. Thus, the theory can clearly reveal the scope of difficulty in learning phrasal verbs and its typologies. Moreover, the analysis in the current study between formal and informal context explains the differences and clarifies whether the game play context affect the outcomes.

Moreover, native speakers of English mostly communicate causally and in everyday context through phrasal verbs and *one-word* verbs are mostly used in academic writings. Phrasal verbs are combined from two particles, namely a single verb and a particle in English. The components seem confusing and ambiguous as many of them do not have *transparent* meanings especially for English Language Learners. In other words, the meaning of the structure is usually not comprehended by understanding the meaning of its semantic components. Thus, the idiomaticity of phrasal verbs can cause difficulties in learning and using them and therefore language learners notice their importance and at the same time consider them problematic early on in comprehension and interaction (Cheon, 2006).

There are two groups of Phrasal verbs. The first group consists of literal phrasal verbs from which the meanings are clearly comprehensible from their components: eat out, go away and figurative phrasal verbs which are not transparent and therefore understanding the meaning of its idiomatic structure and parts is almost impossible as it does not carry the exact relevant semantic meaning through its chunks: brush upon, take after, grass on (Lia & Fukuya, 2004).

The second type of phrasal verbs which is called figurative is considered as a difficult to comprehend task for second language learners. Therefore, findings reveal that various language learners from international backgrounds such as Chinese had problems in comprehending received messages and did not attempt to use this kind of complicated structures. Thus, in second language learning studies focus on phrasal verbs are crucial as majority of students avoid and neglect the structure (Dagut & Laufer, 1985; Laufer & Eliasson, 1993; Liao & Fukuya, 2004). In the present study therefore the first group consists of verbs whose definitions are known from the definition of its associated chunks as in L1- L2 similarities. The second idiomatic category are not understood from its initially semantic structures and particles and are also divided into two subcategories. The first subcategory is based on idiomatic expressions whose L1- L2 meanings had differences and the second subcategory consists of L2 complexity.

2.2. Avoidance

Contrastive Analysis can illustrate the complications encountered by learners of a language and comparison of the new phrasal verbs with their first language and the target language. Moreover, the errors encountered by learners can also provide sufficient data to examine the fields of frustration and complexity. However, students encounter errors but they are not the only source of learners' difficulty to be evaluated or looked for as some learners might totally avoid some phrasal verbs as they are not able to recall the

appropriate components or usage in the target language, get confuse as the structures might look very similar to the previous schemata of separate segments so that not making any errors does not mean that the learner does not have difficulty in using or comprehending the specific lingual elements (Gluth, 2008).

Avoidance behaviour first was introduced by Schachter (1974). The study of avoidance behaviour that was introduced for the first time focused on syntactic behaviour and compared the errors in relative clauses that participants encountered in speech. The results of investigation show that difficulty of using the idiomatically complex components for Japanese and Chinese learners is predicted by the idea of contrastive analysis. The findings revealed that "if students find a particular construction in the target language difficult to comprehend it is very likely that they will try to avoid producing it" (p. 213). Thus at this stage, a focus on comprehension is as important as producing it. The study uses error analysis which means contrastive analysis can be utilized by distinguishing between types and causes for errors. She concluded that avoidance or errors in interaction are due to difficulty in comprehending and learning that particular form.

It had been argued (Kleinmann 1977, 1978) that language learners turn toward avoidance strategies, when the target language structure is not recognizable from its separate chunks and they perceive it as difficult to comprehend based on the difference from their first language. According to Schachter's (1974) idea that clear first and second language distinctions results in structural variety and therefore predict the issues several studies found many interactions in which semantic avoidance occurred (Liao & Fukuya, 2004; Tarone, Frauenfelder & Selinker, 1976). Ickenroth (1975) proclaimed approaches and types of escape routes that lead to avoidance or some errors with which they may partially convey their message that students used a synonym or subordinate in order to have paraphrasing route. Thus making the correct form of phrasal verbs and comprehending them even more complex (Gluth, 2008). According to Hulstjin and Marchena (1989) and the findings from Liao and Fukuya (2004) also revealed that participants neglected studying phrasal verb knowledge and substituted that with one word verbs which leaded to inappropriate and confusing structure in their utterance (p. 209- 210).

Laufer and Eliasson (1993) distinguished between various factors and causes of avoidance or errors in usage and comprehension as follows: Differences between first and target language (Dagut & Laufer, 1985), similarities between the target and first language (Hulstijn & Marchena, 1989) and second language complexity. They collected translation and multiple-choice test results from Swedish learners of English. Phrasal verb structure was similar to their first language (Liao & Fukuya, 2004). Results

of the study revealed that learners of English language whose first language is Swedish do not avoid phrasal verbs and it is not categorical. The finding directly provided a support for the claim that structural difference between first and second languages is a source of phrasal verb learning difficulty (Dugut & Laufer's, 1985). The participants' native language played a significant role in the avoidance. Those students whose L1 lacked the linguistic components typically avoid phrasal verb, however the participants whose first language had similar linguistic component used it correctly and did not avoid the item. Furthermore, Swedish language learners used literal and figurative verbs equally and evenly. This implied that semantic similarity has a major role in correct usage of phrasal verb knowledge. Participants from Hebrew background avoided figurative phrasal verbs but Swedish learners did not avoid the appropriate usage. Therefore, similarity between first and second language did not cause avoidance. Differences between native and target language are the most significant cases of avoiding phrasal verbs.

In Persian one of the verb structures is a prefix followed by a verb (get back) and verb particle does not exist in the language and the verb follows the particle. In contrast, English phrasal verbs are structured differently and the particle comes ahead of the verb. Moreover, the structure is inseparable and the infinitive is considered a single unite rather than two chunks that is generally seen in English language. In other words, the structural variety and differentiation between phrasal verb of Persian versus English language causes a preference over a more familiar component from their native language or even to avoid it completely.

2.3. Studies on Digital Game-based English Language Learning in Iran

There are eight studies so far on language learning through or about digital games in Iranian context. However, none of the studies were in line with promoting phrasal verb knowledge with digital games as a facilitator. While majority of the studies are on vocabulary learning (Aghlar & Tamjid, 2011; Taghizadeh, Vaezi, & Ravan, 2017; Shahriarpour & Kafi, 2014), inclusion of pragmatic competence instruction and learning based on video game as a proposed novel approach revealed positive improvement both for acquisition of apology and request speech (Shirazi, Ahmadi, & Gholami Mehrdad, 2016).

Online survey data clearly revealed that participants utilize digital technologies to improve their language skills informally. The results of the survey reveals that Iranian English language learners are actively implementing computer and mobile assisted acquisition (e.g. serious digital games and music) for learning beyond classroom and mostly as a daily

routine (Xodabandeh, 2018). Most of previous studies on digital game-based learning in Iran was conducted in the classroom and through various teacher instruction. However, Xodabandeh's survey revealed that most Iranian learner-players download and interact with the digital games beyond classroom and as a mobile assisted language learning and without any teachers' suggestion of the games or instruction involved which reveals their motivation to use technology.

Bahojb Jafarian and Shoari (2017) also conducted a quasi-experimental traditional versus digital game-based research to foster vocabulary among elementary level students and the findings reveal strong support and positive opportunities that games bring in to word acquisition process. According to Keraroudi, Babaie Shalmani and Pourmohammadi (2016) digital game outperforms control group (teacher-fronted instruction) among primary school students' vocabulary retention. On the other hand, Shahriarpour and Kafi (2014) interview and observation for L.A. Noire Digital Games to learn vocabulary reveals changing direction from rote learning to meaningful learning, however neglecting the fundamental effect of phrasal verbs avoided by Iranian students or comparing formal versus informal learning impact. Thus this study will be unique in the implementation of the innovative technology and digital games in Iranian classrooms with an emphasize on meaningful learning.

3. Method

3.1. Materials and Instrumentation

The integrated serious educational digital game was adopted from a game company. It was installed on students' mobile phones and it is a flexible learner friendly app. Formal focus on phrasal verbs is through material teaching for six sessions and students played the digital game any time and wherever they wanted. The informal treatment group were introduced to the game and they were informed to play the game as an autonomous learner-player. There are pre and post-test to know their phrasal verb knowledge and subcategories before and after the treatment. There were approximately 70 new phrasal verbs to be learned by students from which 34 were randomly selected as part of the test. Students played the game and informed their perceptions through open-ended questionnaire.

3.2 Learning Procedure

Students in formal group did not learn with traditional teaching as the avoidance of phrasal verbs indicates that traditional teaching currently involved is not promoting student's phrasal verb knowledge. The teaching material is developed by the educational game company and therefore is in harmony with the informal groups' outside of class activities. Formal group's

lesson plan contains similar teaching materials. It is the nature of the activity itself that differs among the experimental groups, as the nature of promotion of language competence includes different learning methods and groups lack fundamental features (e.g. attending the classes vs. autonomous team building outside of the formal setting) and principles of digital game experience that distinguishes them. That is the only difference to make the results more reliable and valid. Learner-players were advised to use techniques of interaction in both groups and among peers such as noticing, guessing, giving peers synonyms in an attempt to help them select the appropriate phrasal verbs in the missing sentences, postpone and ask them to come up with the right phrasal verb, explaining the meaning of consistent categories or the degree of metaphorical meanings, or repeat the appropriate construction in the new context so that students/ peers notice or be aware of the structure and the appropriate usage.

3.3. Peer Review and Collaboration

Pair work or collaborative learning are crucial factors and facilitator support in fostering language learning through digital games. Collaborative learning and the roles of participants during game sessions is not only within the game or within game interaction or game feedback but collaborative learning is intended to find the appropriate answer relying on students gathered knowledge from pair and team work or other sources and through the game play. The authors emphasize that their findings on collaboration corroborate previous studies by Ke and Grabowski (2007) amongst many other researchers, and the results linked to the coordinator and facilitator role of the tools validate the recommendations by Garris, Ahlers and Driskell (2002). Thus the current study investigates the findings on a more structured collaboration within classroom versus game play informally as a facilitator where students were supposed to have more autonomous understanding of the context of play and learning through game interaction or when they gather among themselves.

3.4. Teambuilding Activities

Teambuilding, broadly speaking is not simply putting the students to sit and work together as it does not ensure or lead to cooperation. Liang (2002) argues that students need the process and need to be taught about the crucial factors or elements of successful teambuilding activities to turn a group of students sitting together into a caring and working team. Thus in this study and during the first meeting, the learners were divided into groups name and identity. They also discussed the structure of the groups and role of each member (e.g. group leader).

3.5. Setting Classroom Rules

In order to set classroom rules namely self-control, democracy and learner autonomy among the groups as well as to promote interpersonal and social skills required for digital game play, the present researcher and participants discussed the rules of 'what to do' and 'what not to do' called 'classroom and outside of classroom commitments and commandments' to both groups. Example of commitments and commandments in the present study are as follows: I will not laugh at other's mistakes, ignore others who need help and I will do the shared work requested by group, peer or partner.

3.6. Data Collection and Analysis

The current study used both quantitative and qualitative collection of data. The participants were also given a questionnaire consisting of Likert Scale Items, adapted from Peterson (2012) and Zarzycka-Pickorz (2016) focusing on broad game play experience in and outside of the classroom and whether the game feedback is sufficient or if they require assistance and additional scaffolding from teacher. Peterson' study examined a group of participants playing a modified MMORPG exclusively, with one another, thereby this study omitted a few of the words related to the vocabulary and changed it with phrasal verbs and added substitutes as they were irrelevant to the current game setting. The questionnaire asked the participants to consider three aspects of the gameplay experience: technical, social/interactional, and pedagogical circumstances pertaining to the game. For the technical perspective, participants were asked to declare the extended problems encountered while communicating in the game and whether or not the game was easy to understand and play. In terms of the interaction and societal aspects of the game, participants were instructed to reflect on the quality and helpfulness of interaction with other players. Pedagogically, the questionnaire examined whether the students perceived gameplay experience as beneficial for improving phrasal verb and communication and they had the freedom to use English language skills more than in a regular classroom.

3.7. Cognitive Load Experimental Study and Experience Assessment

In an experimental study by DeHaan, Reed and Kuwada (2010), they investigated the impact of digital games to hinder recall and noticing new vocabulary acquisition among Japanese university undergraduates. The students in the study were divided into two experimental groups. While the first group members were playing digital game for twenty minutes the other group watched and monitored the game simultaneously on a different computer without actually playing the game. Following the gameplay course, a cognitive load assessment, a memory test for vocabulary, an interview and questionnaire data, and a delayed vocabulary recall test results were collected. The players and the participants who only watched the computer game could remember new vocabulary from the game equally well, however,

the players remembered significantly less items from the vocabulary list compared to those who monitored and focused on the actual task of vocabulary acquisition. This seems to be the effect of the relevant external cognitive load that the digital game play by doing induced to the participants; it seems that the players' by doing recognized the game and its language to be complex compared to those who only monitored the game and had more time to focus on the learning process as well as on how the game is being played. The study of cognitive load assessment questionnaire also elicited students' feedback on both of the treatments. The findings show that the treatment in which participants should focus on both tasks, considered game play and learning impossible, or very hard to perceive.

Cognitive load assessment questionnaire assesses the amount of mental effort used in doing a task (Paas, Van Merrienboer, & Adam, 1994) and experiences of material and task complexity (based on Kalyuga, Chandler, & Sweller, 1999) can investigate the difficulty as well as the appropriateness of the game for the cognitive and proficiency level. Mental effort may not always be perceived as the same as complexity of material. A particular student may perceive a task as complex but not be ambitious to precede any cognitive activity and effort to solve or even comprehend it. The questionnaire items distinguished between the cognitive load from formal versus informal play with the game app and cognitive load from the game play. The Likert scale is based on very easy, easy, moderate, somewhat hard, hard, very hard and impossible to learn for the 7 rating scale. Number 1 starts from very easy and number seven the impossible.

4. Results and Discussion

4.1. Results

This study sought to explore the impact of formal versus informal digital game play in developing phrasal verb knowledge and motivation. The data based on which this question was answered were the students' pre and post-test scores. The mean scores from the two groups are analysed.

According to Table 1 One-Way ANCOVA was applied to compare the mean score of formal and informal treatment and adjust or detect a difference in regression of means from pre to post-test scores, an analysis of covariance. Univariate Analysis of Variance by comparing both formal vs. informal learning from pre to post-test mean scores is utilized in this study. The p-value for both groups is less than .05. The results of inferential statistics between groups therefore reveals that there is a statistically significant difference between the post-test mean of the groups. Game as formal learning has significantly higher mean score compared to informal learning among Iranian students. The mean score difference is 3.45.

However, in general, the results show positive improvement and effectiveness in both treatments.

Table 1

Univariate Analysis of Variance Between Formal vs. Informal Learning Dependent Variable: Postest

	Mean	Std. Deviation	N	Sig.
Formal	25.31	4.470	51	.000
Informal	21.86	4.798	50	.000

Table 2

The Comparison of the Formal vs. Informal Education

	Sum of Squares	df	Mean Squares	f	Sig.
Between Groups	301.158	1	301.158	14.017	.000
Within Groups	2127	99	21.485		
Total	2428.158	100			

Table 2 shows that the type of treatment in formal group results in significantly higher mean score compared to informal game play ($F(100,1) = 14.017$, $p<.05$).

With regard to the second research question, attitudes of player-learners among formal vs. informal approach, the questionnaire results compare participants' belief and perceptions to the role of teacher's contribution in their future game play activities and whether (if any) teacher is required was elicited. The results of questionnaire are as follows:

Table 3

Questionnaire Results Formal with Teacher vs. Informal Education

	Method* Formal Crosstabulation		
	Formal	Informal	Total
Formal inside class with teacher	29	30	59
Formal inside class without teacher	5	3	8
Informal education at home, coffee shop	10	15	25
Total	44	48	92

As you can see in Table 3, the number of participants who were in favour of Formal Inside Class with Teacher is the highest (N= 59), followed by the Informal Education at home, coffee shop (N=25) and Formal Inside Class without Teacher (N=8). This trend is in harmony with post-test mean score results.

Table 4

Comparison Between Interaction with the Game, Interaction with Peers Formal vs. Informal Group Descriptives

Questionnaire			Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean Lower Bound	95% Confidence Interval for Mean Upper Bound
Classmates are helpful	Formal	1	3.55	.826	.115	3.31	3.78
	Informal	49	2.64	.888	.126	2.39	2.90
	Total	100	3.10	.967	.96	2.91	3.30
I enjoyed game interaction	Formal	51	4.50	.702	.098	4.30	4.69
	Informal	50	4.60	.547	.077	4.44	4.75
	Total	101	4.55	.062	.062	4.42	4.67
I learn Phrasal Verbs	Formal	51	4.35	.522	.073	4.20	4.49
	Informal	50	3.80	.936	.132	3.53	4.06
	Total	101	4.07	.802	.079	3.92	4.23

Cognitive load assessment description of mental efforts of the game play or phrasal verb also indicates if the complexity or difficulty of the game play is adaptable among Iranian students or to what extent the method of learning challenges their cognitive ability or if it makes learning and playing impossible or difficult to comprehend due to higher mental demand.

The participants were instructed to score each item on questionnaire using a six-point likert scale (1= Strongly disagree and 5= Strongly Agree). The number of questionnaire items 'Classmates are helpful' is utilized on the Table 4 instead of the main sentences *Other Players were helpful, there was not much feedback from other players, most of the discussions with classmates are not useful.* 'I enjoyed game interaction' for *I enjoyed interacting with the game, I enjoyed learning new phrasal verbs in the game,* I wish to play the digital game in the future and 'I learn Phrasal Verbs' instead of 'I could learn new phrasal verbs', 'The game made me construct new sentences with phrasal verbs than in regular class'. The terms are specified instead of the eight items of questionnaire to better fit the purpose of the current study and also performed to evaluate all of the relevant items as three main categories. As the purpose of the relevant questionnaire items are similar, their average mean score gives stronger content validity.

Comparison show that Formal Player Feedback (M = 3.55; 95% confidence interval= 3.31, $p<.05$) had productive interaction with peers compared to Informal Player Feedback (M= 2.64; 95% confidence interval= 2.39) which had lesser satisfaction and classmate's usefulness when they encountered difficulties. Formal classroom setting also resulted in constructions of new sentences significantly higher (M = 4.35, SD= .522) than informal game play (M= 3.80, SD= .936).

Table 5

Cognitive Load and Play Descriptives

Questionnaire		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean Lower Bound	95% Confidence Interval for Mean Upper Bound
Mental effort for play	Formal	51	4.92	.891	.125	4.67	5.17
	Informal	50	5.16	1.131	.160	4.84	5.48
How easy or difficult was the game?	Formal	51	4.02	.883	.124	3.77	4.27
	Informal	50	4.62	.725	.103	4.41	4.83
How easy or difficult to understand?	Formal	51	4.35	.955	.134	4.08	4.62
	Informal	50	4.14	1.278	.181	3.78	4.50
Mental effort to learn phrasal verb	Formal	51	5.12	.973	.136	4.84	5.39
	Informal	50	5.40	1.309	.185	5.03	5.77

As the Table 5 shows, the mean scores of the play across the two treatment groups are slightly different: formal (M= 4.02, SD= .883), informal (M= 4.62, SD= .725). As can be seen, there is no statistically significant difference between the two groups regarding the degree of play, cognitive load for play or to learn new phrasal verbs.

The three subcategories of phrasal verbs are Literal (*L1-L2 similarity*), Complex Figurative (*L1-L2 differences*) and Very Complex Figurative verbs (*L2 complexity*). These subcategories mean scores are also collected in order to demonstrate whether or not student's intake of phrasal verb categories are evenly, equally or categorically promoted and are explained as below:

Table 6

Mean Score Comparison Between 1) Post Literal, 2) Post Figurative 1 and 3) Post Figurative 2

	N	Minimum	Maximum	Mean	Std. Deviation
Mean.PostLit	101	0.31	1	0.7	0.12
Mean.Figurative 1	101	0.29	1.43	0.75	0.27
MeanPostFigurative2	101	0.18	1.18	0.63	0.21
Valid N	101				

As Table 6 shows, the mean scores of Post Literal (M= .70, SD= .12) and post Figurative 1 & 2 (Mean.Figurative 1 =.75, SD= .27, Mean. Figurative 2=.63, SD .21). Furthermore, no significant differences were found between the post- test mean scores of phrasal verb subcategories. The total number of test questions were 34 and the number of Literal and Figurative 1 & 2 were 16, 7, 11 respectively. To indicate what the mean score of the subcategories are toward one another computation analysis of variables was applied.

Table 7

Mean Score Comparison Between 1) Literal, 2) Figurative L1- L2 Differences 3) Figurative L2 Complexity

	Literal/Figurative	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean Lower Bound	Upper Bound
PreLit	Formal	51	7.05	2.239	.313	6.428	7.68
	Informal	50	7.02	2.519	.356	6.304	7.73
PreFig 1	Formal	51	3.45	1.688	.236	2.976	3.92
	Informal	50	3.36	1.381	.195	2.967	3.75
PreFig 2	Formal	51	3.03	1.636	.229	2.578	3.49
	Informal	50	3.46	1.716	.242	2.972	3.94
PostLit	Formal	51	11.92	1.988	.278	11.362	12.48
	Informal	50	10.62	1.783	.252	10.113	11.12
PostFig 1	Formal	51	5.64	1.775	.248	5.147	6.14
	Informal	50	4.98	2.065	.292	4.393	5.56
PostFig 2	Formal	51	7.66	2.430	.340	6.983	8.35
	Informal	50	6.26	2.145	.303	5.650	6.86

P-value for effect of Phrasal Verb Categories on Post-test is significant <0.05 level.

Comparison shows that all three subcategories; Post literal treatment (Mean difference = 1.3; 95% confidence interval = 1.249, 1.36), Post Figurative 1 (0.66; 95% confidence interval= 0.754, 0.58) and Post Figurative 2 (1.4; 95% confidence interval = 1.33, 1.49) performed better in formal group compared to informal game play.

4.2. Discussion

Commercial college-level advanced L2 learners for new literacies in classroom as both text and practice, expressed mixed reactions 1) embraced the game as new, effective and pleasurable 2) resistance cause of a clash between expectations about language learning, play and the constraints of the classroom (Reinhardt, Warner, & Lange, 2014). This study is also in line with the current study and relevant to various methods and game play experiences. Although all participants embraced the game as an enjoyable tool that improves their knowledge of phrasal verbs, learning and skills, but resistance and a clash of expectations occurs among informal outside of the class participants. Students' post-test score drops dramatically in informal game play as an autonomous learning outside of the institute and educational settings where applied that students are left to explore the game and learning further from their community and not capable to manage their own mediated and self-directed learning as game play practices takes the role of language teachers to diagnose their learning needs. At the end of the experiment participants resist the change and expect a teacher role and further engagement with extra classes in a formal setting. However, the formal game play context had stable outcomes in this regard with informal game play

requiring mediated teaching and gamifying within class and the facilities. Classroom observation also indicated that when instruction included higher levels of autonomy and relevant commands were given by the instructor, students could not manage learning from themselves and through digital game play and they got confused, expected and relied on a teacher. After post-test was taken students in informal group demanded a formal classroom session to clarify and to ask their questions from a teacher. Although they were capable to solve their language related difficulties, but relying on a teacher or having peer work in classroom even if it is for one session, at times was demanded.

Iranian learners avoid using phrasal verbs and neglected in the previous studies as the structure is not parallel, confusing and complex in nature compared to Persian which is their first language and due to the fact that improving phrasal verb knowledge in language classrooms is not the main focus and mostly avoided by the instructor (Ghabanchi & Goudarzi, 2012). Thus, the treatment in this study was based on digital game play and the results from pre and post-test and therefore the mean score difference reveals an evenly distribution and promotion based on student's language proficiency level. Although based on the hypothesis and complexity of figurative structures, we assumed that the post-test result for figurative complexity category will not improve, it shows an evenly improvement equally well compared to literal and figurative 1 and 2. Student's classroom observation as well as questionnaire results also revealed significantly higher levels of collaborative learning in formal context versus informal. Overall, digital game especially formal implementation of Digital Game-Based Language Learning (DGBLL) improved intermediate students' phrasal verb knowledge identification, intake and can improve their underdeveloped knowledge.

5. Conclusion and Implications

The main purpose of this study was to evaluate the impact of formal versus informal digital game play, subcategories (Literal, Figurative) and cognitive load on promoting phrasal verb knowledge from both qualitative and quantitative results.

The results of the study revealed that the main effect of the treatment is in favour of formal classroom, and although both treatments improved phrasal verb knowledge, but treatment condition has significantly higher effect, and there is equal improvement of literal and figurative scores and cognitive load assessment of play is higher for formal group.

Fundamentally, the upshots of the study are in the same line with Binzak et al. (2016), Game a Palooza which revealed no significant differences between formal and informal play. However, the results of formal

versus informal context of learning among learner players in an Iranian setting reveals a significant difference between the two groups. The digital game play within formal classroom setting outperformed informal learning where students had to apply their extended degree of autonomy and relevant skills.

Moreover, interaction with peers linked further to the requirements and students are in favour of formal learning as peers and classmates give higher constructive feedback. Autonomous learning in informal setting does not improve classmate feedback or helpfulness.

The limitations of the current study are the lack of a longitudinal game play after the course of six weeks is over and the future study can collect a delayed post-test score after two or three months later to see if the longitudinal game play time spent and the post test scores match with the group context or if the results and findings matches and is the same compared to the current study which collected the post tests and questionnaire immediately after finishing the course among player learners. Other studies could be conducted on the topic with different genders, advanced level of proficiency and virtual classroom setting. Other studies could find the results from productive written performances and the outcomes collected among other methods and groups.

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Appendix 1

Sum of Squares, df, Mean Square, F and Sig. among Literal and Figurative Categories

		Sum of Squares	df	Mean Square	f	Sig.
PreLit	Between Groups	.038	1	.038	.007	0.935
	Within Groups	561.804	99	5.675		
PreFig 1	Between Groups	.209	1	.209	0.088	0.768
	Within Groups	236.147	99	2.385		
PreFig 2	Between Groups	4.470	1	4.470	1.59	0.21
	Within Groups	278.342	99	2.812		
PostLit	Between Groups	42.771	1	42.771	11.98	0.001
	Within Groups	353.466	99	3.703		
PostFig 1	Between Groups	11.234	1	11.234	3.034	0.085
	Within Groups	366.627	99	3.703		
PostFig 2	Between Groups	49.958	1	49.958	9.494	0.003
	Within Groups	520.953	99	5.262		

P-value for effect of Phrasal Verb Categories on Post-test is significant <0.05 level.

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