The effect of implementing web 2.0 tools on the development of grammar competence in a hybrid English as a foreign language setting

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1. Abstract

Although the effects of the integration of web 2.0 tools for the development of writing skills in teaching English as a foreign language (EFL) have been documented in literature, an integrated use of wikis and other asynchronous web 2.0 tools for the improvement of grammar competence in a hybrid EFL setting remains fairly unexplored. This paper investigates the potential of implementing various web 2.0 tools for the development of students' grammar skills in a tertiary English as a Foreign Language course. We present the results of an experimental study conducted among first-year undergraduate students engaged in collaborative form-focused activities in a hybrid EFL course. In these collaborative online activities the students' written language production in a wiki was accompanied by multimedia artefacts representing particular EFL grammar concepts which the students created using web 2.0 tools. The described activities represent an innovative fusion of elements from EFL pedagogy, computer-assisted language learning (CALL) and multiliteracies education. Since the data analysis of grammar competence tests did not yield a significant statistical difference between the grammar competence level measured after the completion of the online grammar activities in the experimental and the control group, it can be concluded that the use of a wiki and other web 2.0 tools in performing online grammar activities in this particular hybrid course did not have a noticeably greater impact on grammar competence development in terms of the acquisition of the specific grammar structures selected for this study and in comparison to the use of a more traditional technology (e.g. MS Word) for the completion of an equivalent learning task.

2. RATIONALE FOR INTRODUCING ONLINE GRAMMAR ACTIVITIES

2.1. Web 2.0 tools and wikis in foreign language instruction

Technological advances and shifting paradigms in the pedagogical use of technology have brought about a transformation of foreign language (FL) instruction at the tertiary level. This transformation is evidenced by an increase in the number of hybrid courses in which face-to-face teaching is blended with one or more computer-assisted language-learning (CALL) formats. According to Goertler (2013), CALL formats can be broadly divided into those based on (1) individual human-to-computer interaction and (2) computer-mediated human-to-human interaction. In the latter category we can find different types of social software that web 2.0 tools also belong to. Generally speaking, *collaborative* CALL gives students enhanced opportunities for linguistic input, output, interaction and feedback (Chapelle, 2003). One of the challenges of implementing CALL is how to exploit these opportunities in computer-based tasks by utilizing the affordances of a particular tool, that is, of "what the program is or appears to be capable of doing in terms of both intended and unintended functions" (Beatty, 2013, p. 115). In the context of tertiary education, McLoughlin & Lee (2007) delineate the affordances of web 2.0 tools as: connectivity and social rapport, collaborative information discovery and sharing, content creation, and knowledge and information aggregation and content modification. Accordingly, incorporating web

2.0 tools into hybrid and online FL courses *creates potential for increased student interaction* and (both collective and individual) *output* in the language/multimedia production and also *facilitates students' awareness* of different aspects of language use, such as vocabulary, syntax or genre (Sykes, Oskoz & Thorne, 2008). Research has shown that the use of web 2.0 tools in FL instruction can have the following positive effects: (a) promotion of collaborative learning, (b) support for the formation of learning communities, and (c) improved linguistic performance and metacognitive learning (for an example of a review of web 2.0 use in FL instruction see: Luo, 2013). Beyond the aforesaid benefits for FL skills development, the use of web 2.0 tools can also promote digital literacy and collaborative team work as one of the essential academic and professional 21st century skills (Yim & Warschauer, 2017).

However, owing to the diversity of tools included under the umbrella term of "web 2.0", in exploring their potential implications for learning, each and every particular web 2.0 tool needs to be considered separately with regards to specific technological demands and teaching/learning outcomes, including the targeted language skills. Chapelle (2003) points out that in discussing the role of technology in CALL it is computer-based *tasks* (and not tools) that provide conditions for learning. In this paper we will focus on the use of wikis and several other asynchronous web 2.0 tools for creating digital artefacts to support online activities aimed at the development of FL grammar competence.

2.2. Wikis and collaborative writing effects related to grammar development

Among the most widely used web 2.0 technologies that facilitate collective knowledge construction in FL teaching and learning are wikis. As a collaborative writing tool (Storch, 2017, p. 66; Pinto-Llorente, Sánchez-Gómez & García-Peñalvo, 2018), a wiki can be effectively used within the social constructivist pedagogical approach, promoting a learners' more active role in content creation and writing skills development. In a comprehensive review of research on using wikis in FL collaborative writing, Storch (2013, p. 142) identified the following research strands: (1) FL perspectives on wiki-based projects, (2) the nature of learners' contributions and engagement, (3) focus on language, (4) patterns of interaction, and (5) the quality of the collaboratively produced text. When focus on language is concerned, attention to linguistic form tends to be incidental, occurring during corrective feedback in the revision process. In most studies, the outcomes of focus on language are reported in terms of general linguistic competence (i.e. lexical or grammatical accuracy). Findings related to online peer corrective feedback are mixed in terms of frequency and accuracy of revisions, and predominantly focus on content vs. structure, among others (Storch, 2013). It was also established that the learners' interventions with their peers' writing depended on their interpretation of the task as a meaning-based (rather than language–based) activity (Kessler, 2009).

Although it is primarily focused on the process of *creating content in form of written text*, collaborative writing can also enhance learning regarding complexity and diversity of information as well as grammar accuracy (see: Ducate, Lomicka & Moreno, 2011). On the other hand, in the study by Elola & Oskoz (2010) no differences in the fluency, accuracy and complexity were reported in the use of wikis for collaborative and individual essays in the same group of respondents. It has to be noted that linguistic accuracy in wiki collaborative writing is rarely an end unto itself. However, a few studies have dealt with the effects of wiki use on the development of *specific grammar concepts/structures*. For example, Castañeda (2011) investigated the impact of the combined use of wikis and video/photo blogs vs. conventional text-based online technologies on the acquisition of the preterite and imperfect aspects in Spanish. Two levels of grammatical achievement were defined: recognition and production of appropriate grammatical structures. While no significant differences were obtained in the two groups at the level of production (in sentence writing), the group using wikis and blogs performed better when the recognition of forms (in a multiple choice test) was concerned. In another study, Castañeda & Cho (2012) established that after the writing activities in a wiki were performed through several stages, the students' knowledge of Spanish preterite and imperfect improved. Still, in the literature on using wikis in FL instruction there is a relative lack of studies on their impact on the acquisition of targeted grammar structures.

2.3. Role of form-focused approach in learning and teaching grammar

Another notable trend in academic FL instruction has been a revitalized interest in focused grammar instruction. It must be noted that grammar instruction is aimed at developing the learner's ability to

produce grammatically accurate and appropriate output in speech or writing (Ur, 2011), which means that the conscious (*explicit*) knowledge of the language systems has been internalized as *implicit* knowledge. Explicit form-based grammar instruction can lead to faster development of grammar competence and is likely to result in higher FL proficiency. In contrast to *implicit* learning, *explicit* learning refers to "more conscious operations where the individual makes and tests hypotheses" (Ellis, 1994, p. 360). In explicit learning, the knowledge of the language system is to a much greater degree acquired through *conscious engagement* with structural aspects of linguistic input, and can be accompanied by explicit presentation of rules.

It can be noticed that over the last few decades the FL methodology has been dominated by communicative approaches. Owing to that, the role of grammar instruction has been reduced, primarily based on the argument that it only results in declarative knowledge that cannot be transferred to procedural knowledge in language use (Nassaji & Fotos, 2004). On the other hand, more recently, several arguments *in favour of* formal grammar instruction have emerged from second language acquisition (SLA) research, which Nassaji and Fotos (2004) summarize as: (1) conscious attention to form in the input as a condition for language learning, (2) possibly facilitative effect of grammar instruction on a student's transition to a higher developmental stages of his/her proficiency, (3) insufficiency of the meaning-based approach for accurate acquisition of grammatical structures, and (4) positive evidence of focused grammar instruction on the level and rate of FL development provided by research. Language skills (including grammar) are increasingly seen as prerequisites for effective academic writing in a foreign language, for which college students may be inadequately equipped (Hegelheimer & Fisher, 2006).

One way to overcome the lack of a focus on form in FL pedagogy is combining the *social constructivist* with the *cognitive constructivist* approaches (Felix, 2005). Among the methods and techniques that can be used within the latter approach are collaborative discovery learning and using graphic organizers (Ortiz Navarrete & Ferreira Cabrera, 2014), both of which are applicable to hybrid FL grammar instruction. In combining wikis with web 2.0 tools for representation of grammar concepts, the textual and visual modes co-occur on the same page/computer screen, allowing for the realization of "complementary intersemiotic meanings" (Royce, 2002, p. 193). Multimodality enables learners to simultaneously produce and process information via different (i.e. visual and verbal) channels, which may have an impact on the understanding of the CALL content (Guichon & Cohen, 2016). The goal of integrating innovative technologies to grammar instruction in CALL should be replacing the traditional structurally-oriented form-focused grammar teaching and providing "a semantic, communicative and conceptual basis for understanding the form in question" (Garrett, 2009, p. 739).

According to the *interaction hypothesis* (Long, 1996), interaction during language production is beneficial for (1) learners' noticing of target structures, as well as (2) their semantic and (3) syntactic comprehension of those structures through the negotiation of meaning. Furthermore, as suggested by the *comprehensible output hypothesis* (Swain, 1993), another condition for the acquisition of morphosyntactic structures is the production of comprehensible output. Another theory that serves as a foundation for the use of web 2.0 tools in this paper is the *Sociocultural Theory*, in which learning is seen as a social activity "mediated by cultural artefacts" (presentations of grammatical content) and by "social interaction in the performance of communicative activities" (Ellis, 2015, p. 251).

By using web 2.0 tools it is possible to add an interactive dimension to explicit grammar learning through concept-based approach and consciousness-raising tasks (Ellis, 2015). A collaborative wiki-based learning environment can provide learners with scaffolding and feedback, while the online platform (e.g. wiki) enables authoring and publishing of grammar-related artefacts in a joint endeavor. In this way the *instructivist* top-down approach can be accompanied by a more *constructivist* bottom-up approach to exploring the language system by the learners, which can make in-class activities seem more meaningful and relevant from the learners' perspective.

3. METHODOLOGY

3.1. Problem and research question

The research in this paper has been motivated by several considerations. Firstly, when form-focused FL instruction is concerned, the issue of the effectiveness of implicit vs. explicit approaches to FL grammar has yielded no conclusive answer. Secondly, the outcomes of different types of explicit

instruction may range from the acquisition of rules to the ability of their implementation in linguistic output. Also, it is worthwhile investigating whether the current (socio)constructivist approaches in which learners, either collaboratively or as individuals, are actively involved in the study of the language system are more likely to result in the improvement of grammar skills. Next, in a hybrid setting, a computer-based approach to learning grammar does not necessarily lead to better results when compared to face-to-face instruction.

Finally, there is a number of considerations specifically related to the use of collaborative web 2.0 writing tools. Research on the use of web 2.0 tools for hybrid language learning is partly focused on the impact of such tools on the *process* of learning in *collaborative* settings. An important criterion for the effectiveness of hybrid learning in general, as well as of certain educational technologies (e.g. web 2.0 tools) in particular is related to the *product*, in other words, to the development of *language proficiency*. While there is evidence that the collaborative use of wikis is beneficial for the enhancement of linguistic competence, it usually emerges as a by-product of activities primarily aimed at the development of writing skills or conceptual knowledge. A review by Wang and Vásquez (2012) revealed that only a limited number of EFL and CALL studies had investigated students' progress in learning associated with the use of web 2.0 tools and also that the most commonly reported positive outcome in those studies was not associated with greater language proficiency but with the creation of a favorable learning environment. In addition, these authors revealed that most of the analyzed studies reported results related to English language learning (58%), the use of blogs and wikis (15% and 10% respectively), as well as that the focus of the studies was on *writing*, as well as on *attitudes and perceptions* of learners. The explicit approach to FL grammar through the performance of activities supported by wikis and several other web 2.0 tools has been scarcely documented in literature. Also, unlike wikis, some other web 2.0 tools that are used in the study in this paper, like the mind-mapping tools, have not been extensively investigated in the context of FL instruction.

In our paper we will investigate the potential of implementing various web 2.0 tools in learning activities designed for the development of students' grammar skills in a *tertiary English as a Foreign Language course*. Therefore the *research question* we address in our paper is:

> *RQ: Does the use of wikis and other web 2.0 tools have a greater effect on the acquisition of respective grammatical structures than the use of conventional text-processing tools (e.g. MS Word) in the performance of online grammar activities?*

3.2. Sample and procedure

The subjects in our research of the use of web 2.0 tools in online grammar related activities were students of two subsequent generations who had enrolled in an *Information Systems* study at a Croatian university. All of the subjects attended an undergraduate one-semester *English Language I* course.

The hybrid learning environment was in form of face-to-face instruction (lectures and exercises) which was combined with the use of a *learning management system* (Moodle LMS) and supplemented with the online wiki module named *Engwiki* (http://e.foi.hr/engwiki/index.php). The use of the *Engwiki* resource was not novel to the instructor since it had previously been applied in two EFL courses for various individual and collaborative writing activities (e-tivities) related to the core content of the *English Language I* course (i.e. business and information technology topics). Those previous online activities (or *e-tivities*) with this wiki system were content-based and were positively evaluated by students.

The primary goal of online grammar activities in the study that is reported in this paper was to allow students to *improve their EFL grammar skills* through active involvement with explicit EFL grammar input and its processing during artefact creation. Other goals included the *development of collaborative writing skill* and *digital literacy*. It must be noted that in both the *preliminary* study and *main* study the activities were collaborative, i.e. performed by pairs of students *out of class*. However, the instructions for the activities and demonstration of the use of web 2.0 tools were first provided *in class*, but also supported with written instructions in the Moodle LMS.

***Preliminary study*.** Students (N=115) worked in pairs to produce two 'grammar reports' on 2 different grammar topics. Each report encompassed (1) a short article in a wiki and (2) an artefact created in a different web 2.0 tool that graphically represented a given grammar topic. In each round students were assigned a (1) particular type of graphic representation (i.e. artefact type) and (2) a

corresponding web 2.0 tool (e.g. the *Gliffy* tool for the creation of flowcharts). On the other hand, students were free to select a grammar concept from a list of available intermediate-level topics organized in several subgroups (word type level; phrase level; syntax; other – functional grammar topics). The distribution of grammar topics and web 2.0 tools was such that the same grammar topic would be covered by several different teams of students using various web 2.0 tools for artefact creation. The authors wish to emphasize that, owing to space limitation of this paper, the results of the preliminary study are only briefly outlined.

Table 1. Overview of online grammar activities implementation and research design

	Preliminary study	Main study	
Participants	N=115	N=80 (experimental group)	N=91 (control group)
Topics	Around 30 intermediate topics including: Word type level, e.g. Prefixes; Suffixes; Making plural; Phrase level, e.g. Collocations, Quantifiers with countable and uncountable nouns; Syntax, e.g. Relative clauses, Using and translating the –ing form Other topics (functional grammar), e.g. Making definitions, Giving advice	5 advanced grammar topics: • Conditionals: Unreal conditions • Causative *have* • Subjunctive and unreal past • Reported questions and commands • Participle phrases	
Artefact types and web 2.0 tools	Grammar report: Wiki article + Mind map (Bubbl.us / Mindmeister / Mindomo) Flowchart (Gliffy) Online strip (Bubblr) Online presentation (SlideSix) Tagging a video (Veotag)	Grammar report: Wiki article + Mind map (Bubbl.us/Mindomo) Concept map (Gliffy) Online strip (Bubblr)	Grammar report: Description of a grammar topic in a MS Word document submitted via Moodle LMS
Research instruments	Survey questionnaire (end of the term): measures of perception of e-tivities and individual differences (learners' psychological variables)	Preliminary test (beginning of the term) Survey questionnaire (end of the term): measures of perception of e-tivities and individual differences (learners' psychological variables) Grammar test (pre-test / post-test)	

Main study. Since the goal of the main study was to establish a possible effect of grammar activities supported by a wiki and other synchronous web 2.0 tools on the *acquisition of respective grammatical structures*, the experimental research design was applied. Students enrolled in the *English Language I* course were divided into the experimental (N=80) and control group (N=91) based on a preliminary test. The aim of the preliminary test was to create two groups that would not significantly differ in terms of their previous knowledge of English. Another aim of the preliminary test was also to establish which grammar concepts students had not sufficiently acquired before the beginning of the experiment with the implementation of grammar activities. On the basis of the results of preliminary test, *five* advanced grammar topics that would not be additionally covered in regular lectures and exercises in the English Language I course were selected. The overview of online activities implementation (topics, multimedia artefact types, web 2.0 tools) and research design is provided in *Table 1*.

In the ***experimental group***, the distribution of grammar topics and web 2.0 tools was such that the same grammar topic would be covered by several different teams of students using different web 2.0 tools for artefact creation. In the ***control group***, each pair of students was also assigned two different grammar topics they had to cover in textual format using only the word processing tool *MS Word*. Students in this group also had to provide a textual illustration of the topic (i.e. find examples of its use in an existing text or write a short dialogue in which it would be used). While the execution of grammar activities in the *experimental group* was transparent and available to every team owing to the use of wiki for text creation and revision, students' work in the *control group* was not visible to other teams and had to be submitted as an assignment via Moodle LMS. Therefore, in the *experimental group*, all the multimedia artefacts, which were added to the wiki pages by using external links, were visible to all the participants in the *English Language I* course. In this way, every student in the course was able to view the work performed by their peers with regards to the same grammar concept or explore how a certain type of artefact (e.g. flowchart) was designed to visualize different grammar concepts.

It is important to note that participation in online grammar activities in both studies was mandatory. However, students' knowledge of grammar concepts which may have improved through the performance of grammar activities was not assessed in regular mid-term tests. The impact on the final grade was thus only made through credits that students were awarded for participation in the activities included in our study. Examples of students' artifacts that are included in our study are shown in the Appendix (*Figures 1-4*).

3.3. Instruments

In the *preliminary study*, following the implementation of the online activities, a survey questionnaire was administered to test the students' experience with using the web 2.0 tools for representation of grammar topics. However, we repeat that the results of the preliminary study which indicated the applicability of the used web 2.0 tools for grammar instruction in terms of students' perception of the online activities are beyond the scope of this paper and are therefore not presented in detail here.

In the *main study*, the following instruments were administered: (1) a ***survey questionnaire*** was applied to test the students' experience with using the web 2.0 tools/conventional IT tools (like MS Word) for representation of grammar topics; (2) ***preliminary test***, which the respondents completed before the beginning of the experiment; on the basis of the preliminary test, students were divided into the experimental and the control group and grammar concepts were identified that would be included in the online grammar activities and not otherwise covered in the course; (3) ***grammar competence test***, which was applied in both groups of respondents before *(pre-test)* and after *(post-test)* the online activities implementation. In both groups the same grammar competence tests were applied. In fact, at the end of the term, after the grammar activities implementation, two tests were applied as components of the *post-testing*: one in which the same pool of questions from the initial test was used (repeated pre-test) and another in which a new pool of questions regarding the same grammar concepts was included (post-test).

Each grammar competence test consisted of two parts. In the ***first*** part of the grammar competence test, there were ten test items (English sentences). Each sentence contained an underlined grammatical mistake related to one of the five grammar topics, i.e. Conditionals: Unreal conditions; Causative *have*; Subjunctive and unreal past; Reported questions and commands; Participle phrases. An example item from the first part of the test is: 'The editor insisted to them to delay publication by one week.' Students had to rewrite the incorrect part of the sentence to provide the correct version. Two test items (or sentences) were included for each grammar topic. In the *second* part of the grammar competence test, ten English sentences were also included. Each sentences contained a grammatical mistake related to one of the aforementioned grammar topics. An example item from the second part of the test is: 'Reading in bed, my hands often get very cold.' Students had to (1) identify/underline the incorrect structure themselves, while (2) also providing the correct version of the sentence in writing. The maximum score in each test was 25. The pool of test items had mostly been compiled from several advanced English grammar practice books.

In the following section, in accordance with the defined research question, we present the results of the grammar competence test in two groups of respondents (*experimental* and *control*). The results

of the survey concerning students' perception of the online activities and the role of psychological variables are beyond the scope of this paper and will not be dealt with here.

4. RESULTS AND DISCUSSION

To determine the impact of the online grammar activities performed with web 2.0 tools on the respondents' grammar competence development, three grammar tests were applied in both the experimental group and the control group (i.e. a *pre-test* before the treatment; a *repeated pre-test* after the treatment; a *post-test* after the treatment), as explained in the previous *Instruments* section of this paper. It should be noted that in our research, *grammar competence* refers to the level of acquisition of the five grammar concepts that respondents were explicitly involved with during the performance of online grammar activities, that is, the measure of their ability to correctly use a given structure in writing. In this section the results of all the three grammar competence tests in both groups of respondents are presented and compared with the aim to establish whether the differences in the test achievement between the two groups (e.g. *experimental*, which used wiki and web 2.0 tools, and *control*, which used only MS Word) are statistically significant.

The *pre-test* was completed by a total of 181 students (88 in the *experimental* group and 93 in the *control* group). The *repeated pre-test* and the *post-test* were completed by a total of 178 students (82 in the *experimental* group and 96 in the *control* group). The data analysis included only the students that had taken all the three tests (a total of 171 students, 80 in the experimental group and 91 in the control group). The experimental group consisted of 66 (82.5%) male and 14 (17.5%) female respondents, while in the control group there were 79 (86.8%) male and 11 (12.08%) female respondents.

In our data analysis, the descriptive statistics measures were used to establish the effect of two types of grammar activities (i.e. the ones supported by a wiki and other web 2.0 tools in the *experimental* group in comparison to those performed with conventional text processing tool MS Word and online services in the *control* group) on the grammar competence development based on the obtained test results. Table 2 shows the descriptive statistics for variables related to grammar competence in grammar tests for both groups of respondents. It is evident that the values related to the grammar competence level measured by the grammar competence tests are consistently *slightly higher* in the experimental group in *all the three tests*. The test achievement values are given as average test scores (M) for each of the tests, wherein the maximum total score amounted to 25.

Table 2. The descriptive statistics for variables related to grammar competence in grammar tests for both groups of respondents, and the differences measured by an independent sample t-test

Measure	Experimental (N=80)		Control (N=91)		t	p
	M	SD	M	SD		
Grammar competence (pre-test)	**7.93**	4.374	**7.11**	4.493	-1.198	.232
Grammar competence (repeated pre-test)	**8.63**	4.766	**8.53**	4.900	-.132	.896
Grammar competence (post-test)	**7.01**	3.737	**6.56**	3.922	-.769	.443

From the data presented in *Table 2* it can also be observed that in the *experimental* group the average value of the test score achieved in the *pre-test* (M=7.93; SD=4.374) is lower than the average value of the test score in the *repeated pre-test* (M=8.63; SD=4.766). Likewise, in the control group the average value of grammar competence measured in the *pre-test* (M=7.11; SD=4.493) was lower than that in the *repeated pre-test* (M=8.53; SD=4.900).

To determine whether the differences between the average scores obtained for the three tests in the experimental and the control group were statistically significant, we performed an independent samples *t-test*. As seen in **Table 2**, the significance levels of the t-test indicated no statistically

significant differences (p value > 0.05) between the two groups of respondents (experimental and control) regarding the mean averages for any of the three grammar competence variables, i.e. average scores in the three tests.

Based on the t-test results presented in Table 1, we can conclude that, since the relative differences in the values of *repeated pre-test* and *post-test* scores between the experimental and the control group - in favor of the experimental group – are not statistically significant, they *do not implicate a higher level of the obtained grammar competence* regarding the use of the five structures selected for the study when a wiki and web 2.0 tools were used for learning activities, in comparison to the more conventional use of MS Word for learning activities associated with equal grammar related structures. In other words, since the data analysis did not yield a significant statistical difference between the grammar competence level measured after the completion of the online grammar activities in the experimental and the control group, it can also be concluded that *the use of a wiki and other web 2.0 tools in performing online grammar activities did not have a notably greater impact on the grammar competence development* in terms of the acquisition of the five particular grammar structures selected for the study, in comparison to a description of a grammar topic in a MS Word document submitted via Moodle LMS.

The research question of our study was: "RQ: Does the use of wikis and other web 2.0 tools have a greater effect on the acquisition of respective grammatical structures than the use of conventional text-processing tools (e.g. MS Word) in the performance of online grammar activities?" The results of data analysis presented in Table 2 do not permit a positive conclusion regarding this research question. However, another question that should be answered is if this is a common finding according to the results of research by other authors. As was mentioned earlier, in their review Wang and Vásquez (2012) found only a limited number of methodologically sound studies which reported positive outcomes of the use of web 2.0 tools on language proficiency and competence, in comparison to the use of more traditional methods of teaching/learning. In a similar study, Golonka et al. (2014) revealed that there is only a moderate support in literature for greater effectiveness of technology use in FL teaching and learning when empirical studies which compare the use of newer technologies with more traditional methods are analyzed. Their conclusion was that the evidence of a greater efficacy of technology use in FL teaching and learning is limited.

5. CONCLUSION

A study by Chao and Lo (2009) revealed positive students' perceptions of a wiki-based collaborative writing environment. In a qualitative study of EFL students' interaction when using a wiki for collaborative writing tasks Li and Zhu (2011) found that the collectively contributing/mutually supportive group reported the greatest level of learning opportunities. Kessler and Bikowski (2010) established that various types of interaction affect student engagement and learning and that the quality of final wiki content may not be significant despite the expectations of the instructor. In their experimental study, Arslan and Şahin-Kızıl (2010) determined that a blog writing task had a statistically significantly positive impact on EFL learning activities related to components of content and organization, while no statistically significant impact was found on vocabulary, language use and mechanics as components of writing. A careful observation of a study performed by Zou, Wang and Xing (2016) indicates that the collaborative nature of the use of a wiki for FL learning might be one of the greatest factors of better learning performance and that wiki technology might be a convenient "media(tor)" for interaction. However, despite the potential positive effect of using wiki-based assignments on grammatical competence in foreign language, not all of the students may find the collaborative use of this technology comfortable and they may not view the text editing of their contributions by peers as sufficiently accurate (see: Castañeda & Cho, 2012).

The results of our study are in line with the findings of related review papers (for instance: Wang & Vásquez, 2012; Golonka et al., 2014). That is, no statistically significant difference was found in the results of learning activity between the experimental group which used a wiki and several web 2.0 tools for collaborative grammar related learning activities in comparison to the control group which used only MS Word as a technology for the completion of the learning assignment. However, in our other studies we found that the technology use in FL online learning activities was favourably evaluated by students of the EFL hybrid university course. It is the conclusion of the authors of this paper that the circumstances or contexts which account for the improvement in motivation, collaboration and learning achievement when using a wiki for EFL should be investigated in more detail

and taken into consideration in educational practice, along with individual characteristics of learners, their level of language proficiency and ICT literacy, as well as their attitudes/perceptions of the interaction between learning tasks and technology.

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7. APPENDIX

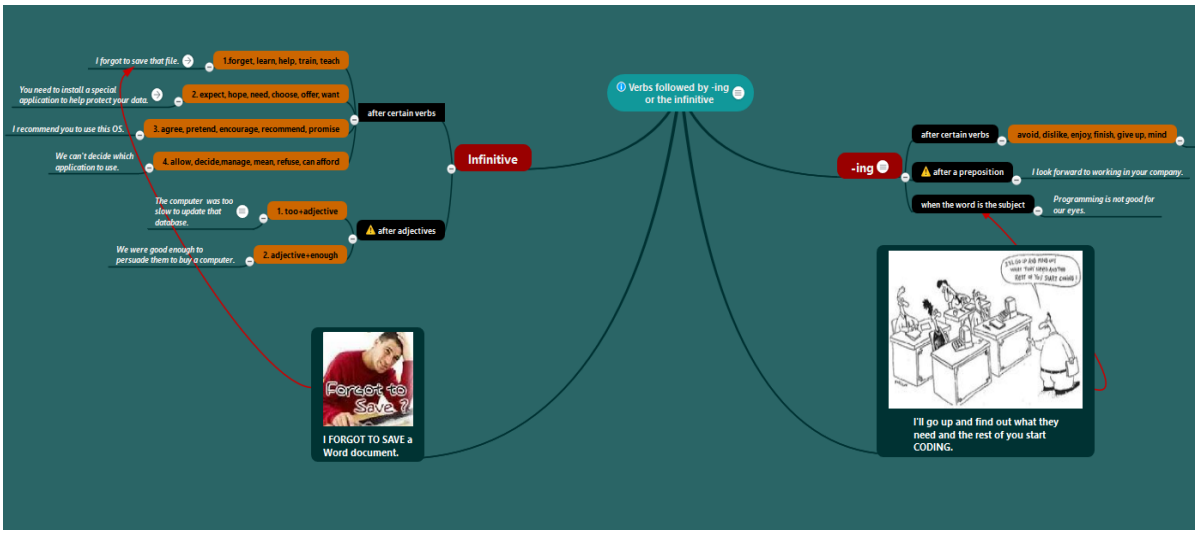

Figure 1. Excerpt from a grammar multimedia artifact (mind map) in the *Mindmeister* tool.

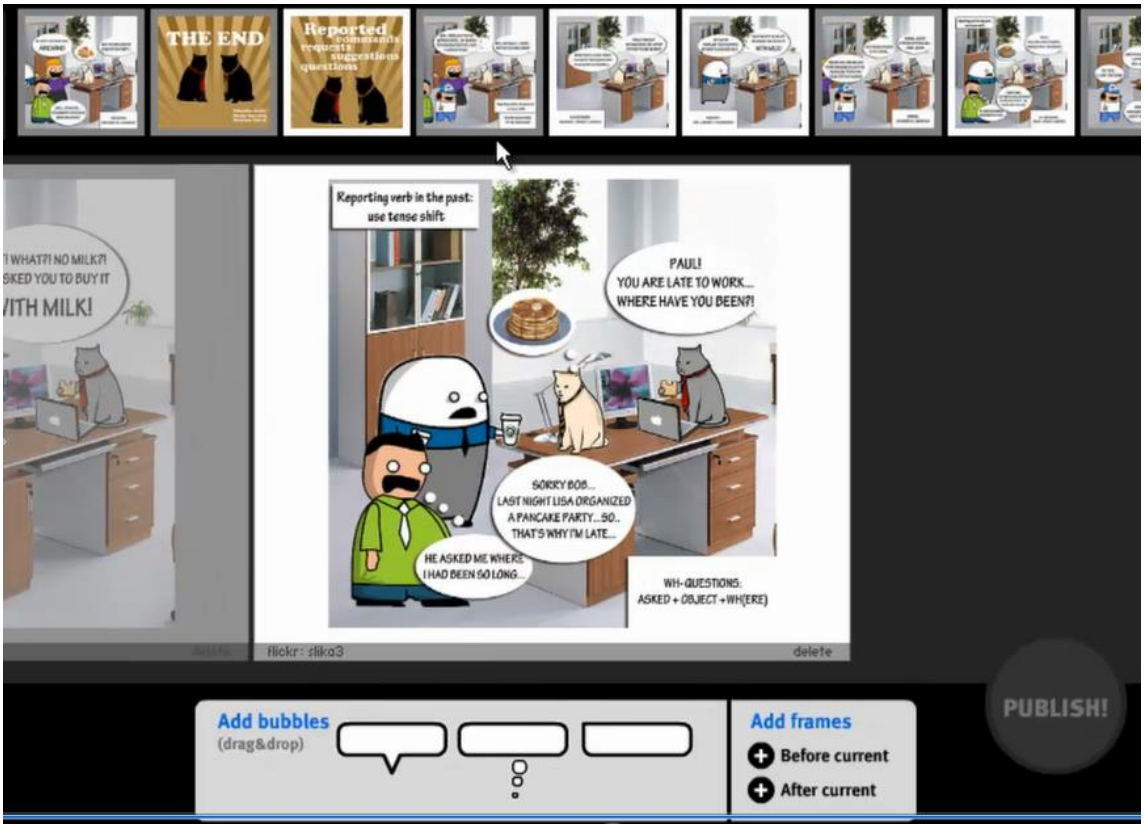

Figure 2. Creating a comic strip in the *Bubblr* tool.

Figure 3. Excerpt from a grammar multimedia artefact (cartoon strip) in the *Bubblr* tool.

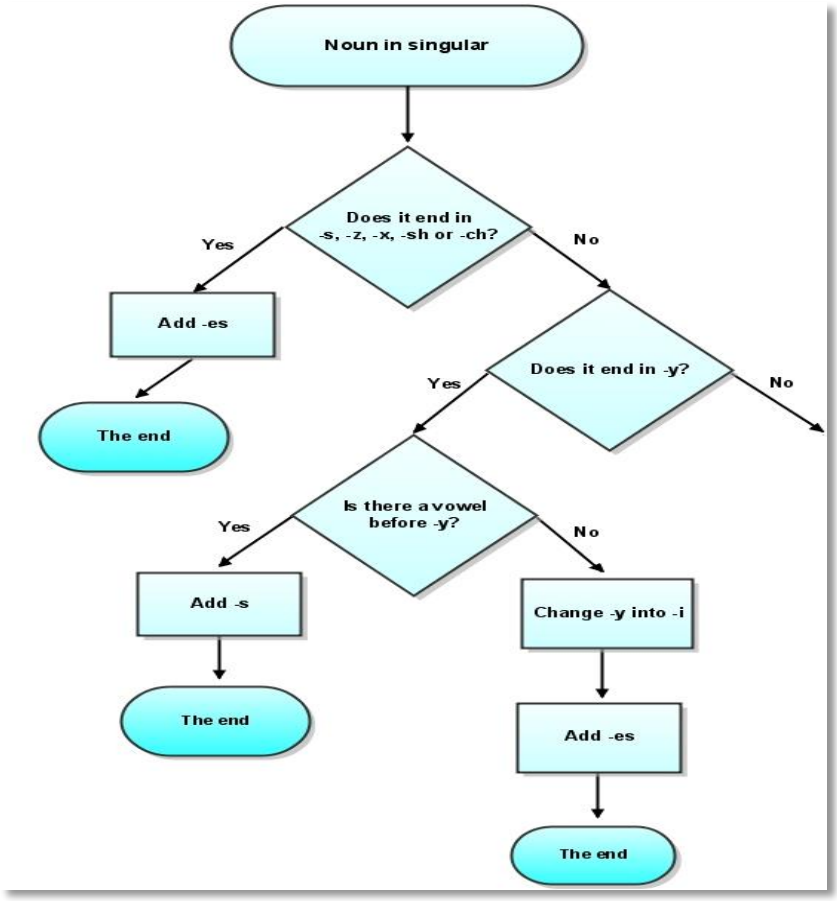

Figure 4. Excerpt from a grammar multimedia artefact (flowchart) in the *Gliffy* tool.

8. AUTHORS' BIOGRAPHIES

Andreja Kovačić holds a bachelor's degree in the English and Spanish language and literature from the University of Zagreb. She has worked as a lecturer of English for Information Technology and Business English at the University of Zagreb, Faculty of Organization and Informatics. Her research interests lie in the connection between various psychological variables and CALL, online teaching of grammar and writing instruction in the hybrid English for Specific Purposes context. She has authored and co-authored around two dozen professional and scientific papers and several book chapters. She was a project leader when she won the EUNIS Dørup E-learning Award in 2008.

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