

THE USE OF INTERNET RESOURCES AND BROWSER-BASED VIRTUAL WORLDS IN TEACHING GRAMMAR

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Abstract

Online virtual worlds are becoming important tools in foreign/second language instruction in view of the fact that they enhance learner motivation, promote autonomy and social presence in a 3D environment. Virtual worlds are a type of reality in which students can meet and communicate with other learners in the target language using text, voice or video as well as share ideas related to language learning. Furthermore, virtual worlds provide learners with the opportunity to take part in virtual language courses or lessons as well as visit places connected with the target language culture.

The aim of the study reported in this paper was to investigate the effectiveness of using online activities and a browser-based virtual world in teaching the second conditional in English. The sample consisted of 27 Polish senior high school students who were randomly divided into two groups: the treatment group (N = 13) and the control group (N = 14). The data were obtained by means of a grammar test administered before (pretest) and after the treatment (immediate posttest and two delayed posttests), a background questionnaire as well as an evaluation sheet, were analyzed quantitatively. The results indicate that the treatment students benefited from the instruction with the benefits being visible not only immediately after the treatment but also after four and eight weeks later.

Keywords: the Internet, browser-based virtual worlds, the second conditional

1. Introduction

Modern technology is becoming increasingly important not only in people's professional areas but also in their personal lives. Language teachers as well as students are using it more frequently and the Cyberspace is now playing a vital role in general education and also it is of great relevance to foreign/second language teaching and learning. More and more language departments, institutes and public as well as private language schools are now using virtual

environments to promote and support language learning (Dalgro & Lee, 2010; Henderson, Huang, Grand & Henderson, 2009; Sobkowiak, 2011).

It should be noted that teaching and learning foreign/second languages with computer technology has been widely recognized and discussed in recent years. 2D and 3D environments, including browser-based virtual worlds, constitute one of the most interesting of the new technologies. What is more, online 3D technologies offer interactive and three dimensional content on the Internet (Diehl, 2002, p. 113). Such new technologies are a source of motivation for learners who can also “engage in a series of purposeful educational inquiries without losing interest or sidestepping intended learning goals” (Cooke-Plagwitz, 2008, p. 547). Virtual environments offer features characteristic of popular commercial games where users function in artificial but realistically rendered imaginatively animated scenes. In such settings they can take part in a series of games or puzzles which include 3D role playing and animated interactive environments. Such concepts, if combined, can supplement language resources and curriculum. What is of paramount importance, however, is the fact that students “in these 3-D environments often have opportunities to experience life-like social interaction while at the same time engaging in meaningful learning activities” (Cooke-Plagwitz, 2008, p. 547).

It should also be added that the Internet offers a great number of virtual worlds which can be accessed by first downloading and, then, installing appropriate software onto a computer system. For less resourced schools access to online virtual worlds can be provided by the use of browser-based virtual worlds (e.g. *Yoowalk*, <http://www.yoowalk.com/> or *Smeet*, <http://en.smeet.com/>). However, some virtual worlds of this kind may require installing a browser plugin (e.g. *FriendsHangout*, <http://www.friendshangout.com/>). What is more, if used solely for language learning, such worlds provide real-time, on-demand connection to interactive language activities and authentic cultural information. However, unlike more technologically sophisticated virtual worlds such as *Second Life*, browser-based virtual environments offer only text-based chat communication, and because of this they lack one of the crucial dimensions which is of particular relevance to foreign/second language teaching and learning, namely voice.

2. Virtual worlds and foreign/second language learning

According to Bell (2008, p. 2), a virtual world is “a synchronous, persistent network of people, represented as avatars, facilitated by networked computers”. Vickers (2010, p. 75), on the other

hand, defines virtual worlds as “immersive and social environments where learners can visit relevant locations online and meet with others for real-time (voice or text) conversations. Virtual worlds, therefore, add a very different quality to online research; whereas the 2D web is rich in (text, audio, image and video-based) content, the 3D web adds a sense of location and realtime social interaction”. For Chittaro and Ranon (2007, p. 3), virtual environments “offer the possibility to recreate the real world as it is or to create completely new worlds, providing experiences that can help people in understanding concepts as well as learning to perform specific tasks, where the task can be repeated as often as required and in a safe environment.” Yet another definition of virtual worlds presents them as “persistent virtual environments in which people experience others as being there with them - and where they can interact with them” (Schroeder, 2008, p. 2). To put it simply, a virtual world can be described as a 3D cyberspace, which allows its inhabitants to meet and talk to other cyber-dwellers in an established online environment.

It has to be pointed out that the idea of a virtual world is not new. There have been several projects over the years in which the user can create his or her avatar, i.e. the graphical representation of the user that exists in a virtual three-dimensional environment (Kelton, 2007, p. 2). First virtual worlds were created in the 1970s and were connected with simulations or adventure games. The users communicated with the computer by means of a keyboard and by simply typing various commands during a game. They were followed by MUDs (Multi-user domains) and MOOs (Multi-user domains object-oriented) and used by teachers to teach foreign languages and intercultural understanding (Shield 2003). Such text-based environments quickly became obsolete and were replaced by more attractive and interactive virtual worlds, for example, *Active Worlds*. Here, a virtual reality was inhabited by users who could communicate with each other by text, interact with various objects and build the world that surrounded them. In addition, virtual worlds such as *Active Worlds* can be viewed as “the extension of chat and MOO into a non-purely-text-based environment, but one with lifelike pictures, objects, the world and special characters (avatars), which are to be chosen to impersonate the user” (Krajka, 2007, p. 125).

Second Life is one of the well-known and popular virtual worlds. It was launched in 2003 and developed by Linden Lab. This world can be accessed by a free client program, or viewer, and its inhabitants, called residents, are able to interact with each other through avatars. Its

residents, among other things, can explore the world, meet other residents, socialize and participate in individual or group activities. Although, in many respects, language education in *Second Life* is akin to traditional classroom one, in view of the fact that during virtual classes traditional school objects are used such as boards or multimedia and students take notes, do exercises or take exams.

Moreover, as Sobkowiak (2011, p. 125) points out, such a virtual environment creates excellent opportunities for language learning since it offers (a) total immersion in the target language, (b) total multisensory and multimedia communication experience, (c) virtual authenticity of the target language and communication activities, (d) the possibility of immediate simulation of various scenery for communication activities, and (e) emotional engagement of the learner. In addition, virtual worlds, such as *Second Life*, provide powerful communication and didactic potential in which (a) students of various cultural background and different time zones can meet together, (b) the student is forced to move in space and use the target language for obtaining help, (c) communication is related to real actions such as walking, sitting or flying, (d) rich language interactively-functional interaction takes place between the teacher and the learner, and also among the learners, (e) language mistakes, which do not interrupt communication, are ignored or saved for further analysis (Sobkowiak, 2011, p. 126).

Traditional methods offer knowledge acquired from coursebooks and transmitted from language teachers to students. However, the use of virtual worlds in foreign/second language education offers a unique opportunity for interaction which can be a valuable substitute for a real experience. It is because virtual worlds offer a first-person experience and allow for lifelike communication as well as for “a spontaneous knowledge acquisition that requires less cognitive effort than traditional educational practices” (Chittaro & Ranon, 2007). As pointed out by Harper, Hedber and Wright (2000), apart from reality, virtual environments are the most appropriate to generate a context based on authentic learner activity. Since virtual worlds provide exceptional opportunities for language learners to explore, collaborate and immerse in a setting of their own selection, they are often used for constructivist learning. As Can (2009) points out, virtual worlds let language learners build objects and change the appearance of their avatar as well as alter places that surround them, which, in turn, enables learners to socially co-construct knowledge in domains which are relevant to students. In addition, virtual worlds can also be applied to task-based language learning with the focus on the use of authentic language and on encouraging

students to make choices about the target language input they process (Collentine, 2011, p. 52). Language tasks can be transactional or they may concentrate on more interactional language, involving social activities or interviews in a virtual world.

Interaction in virtual worlds offers language learners informal paths to learning the target language that is socially constructed. On the other hand, such environments not only can be used in more formal learning which takes place in the classroom, but they can also include Dogme language teaching principles (Vickers, 2010, p. 77). Dogme is a communicative approach that does not make use of published teaching materials of any kind in language lessons but instead encourages teachers to concentrate on conversational communication among students (Thornbury 2000). What is more, the principles of Dogme language teaching offer “teachers guidance on how to incorporate virtual world experiences into the language learning process” (Vickers, 2010, p. 78).

According to Can (2009, p. 69), the implementation of virtual learning environments in the context of foreign/second language learning could benefit students with enriched resources and possibilities for language use, construction and practice. In addition, Chittaro and Ranon (2007) claim that 3D virtual environments offer a great number of benefits for language learning which may be related to: (a) three dimensional graphics which offer more realistic and detailed demonstration of topics, (b) the possibility of analyzing the same issues or phenomena from different perspectives, (c) easier and more appealing interaction with another student when compared with interaction with a coursebook or a computer, (d) the presence of virtual teachers or other animated pedagogical agents, i.e. lifelike characters, which may have a positive impact on learners’ perception of the learning experience, and (e) the opportunity to collaborate with one or more virtual companions, or avatars.

It should be kept in mind, however, that in spite of the advantages mentioned above, there are also drawbacks of using virtual worlds in language teaching and learning which may include: (a) difficulties in navigation and in the use of 3D interfaces, (b) teachers’ lack of experience or difficulties in classroom use, (c) students’ disappointment with the lack of realism of some virtual worlds, and (d) cost of hardware (Chittaro & Ranon, 2007).

3. The study

3.1. Research questions

The study aimed to explore the effectiveness of using online resources and a browser-based virtual world in teaching the second conditional in English. More precisely, the present study was guided by the following research questions:

1. Did the use of Internet resources and the browser-based virtual world result in better learning of the second conditional?
2. Did the treatment produce lasting effects, as measured on immediate and delayed posttests?
3. What was the students' opinion of the lessons?

3.2. The design of the study

The study was carried out during regularly scheduled English classes and involved one intact third grade senior high school class randomly divided into two groups designated as the treatment group and the control group. The groups were taught by two English teachers: the present author and his colleague. It should be noted, however, that only the learners in the treatment group received instruction concerning the target structure. On the other hand, the control students worked with regular coursebook material practicing different language skills. The decision to focus in the course of the present study on the second conditional was motivated by the fact that the subjects displayed problems with correct, meaningful and appropriate use of the structure not only in spontaneous but also in controlled production. This was despite the fact that they had been taught it in the past as well as it appeared occasionally in various activities and materials utilized during English lessons.

In addition, the study was conducted according to *the pretest-posttest design*. The pretest was administered one week before the treatment and the posttest was conducted immediately after it. The study also involved two delayed posttests administered four and eight weeks after the immediate posttest, respectively. The inclusion of the delayed posttests enabled the researcher to explore both the short- and long term effects of the intervention as well as to determine the extent to which the improvement was maintained over time. The treatment continued for the period of two weeks and comprised four 45-minute lessons. What is more, prior to the treatment the

participants of the study were asked to fill in a background questionnaire. An evaluation sheet was completed by the treatment students after the immediate posttest.

3.3. Participants

Twenty-seven third grade students of senior high school were randomly divided into two groups: the treatment group (TG) (N = 13) and the control group (CG) (N = 14). The curricular policy of the school provided the learners with three 45-minute English lessons per week. Roughly one week before the treatment, the participants of the study were asked to fill in a questionnaire whose aim was to provide background information related to the students' personal history of foreign language learning, access to the Internet and type of out-of-class exposure.

The analysis of the responses revealed that, on average, they had been learning English for 8.48 years. What is more, the grade point average in English at the end of the second grade amounted to 2.47 on a 0-6 scale and the participants' self-assessment equaled 2.63. 26% learners admitted to attending some additional courses or tutorials; however, they were limited to extra school lessons, the aim of which was to prepare the students for their final exam. The subjects reported some out-of-class exposure to the target language, mainly limited to watching English movies with Polish subtitles (74%) and listening to English music (70%).

All subjects stated that they had access to the Internet at home; however, they used it only occasionally to learn English. When asked about the most frequently practiced skills and subsystems via the Internet, the students indicated vocabulary (59%) and reading (44%). Additionally, speaking and grammar were the least frequently practiced (7.4% and 22.5%, respectively). Moreover, the subjects pointed to vocabulary (64%) and reading (48%) as their most favorite areas to learn whereas grammar (74.5%) and speaking (48.14%) were considered to be the most difficult for them to study.

3.4. Instruction and treatment materials

The treatment started with a multimedia presentation of the second conditional and relevant examples provided by the teacher. This was followed by two interactive activities created by the teacher by means of the computer program *Hot Potatoes* and published on the teacher's website (<http://www.staff.amu.edu.pl/~anglik/>) as well as one online exercise available at <http://web2.uvcs.uvic.ca/elc/studyzone/410/grammar/2cond1.htm>. These were matching,

translation and multiple-choice exercises. Next, the subjects were given handouts which contained several sentences to be completed with the verbs provided (e.g. *I ... that if I were you. It's bad luck.* (not / do)). The activity was checked by the teacher, who asked at random several students to read the answers. Finally, the learners were asked to do an online activity available at <http://web2.uvcs.uvic.ca/elc/studyzone/410/grammar/2cond2.htm> as a homework assignment.

During the second lesson the subjects were asked to perform a series of online activities of the following type: multiple-choice exercises created by the teacher and a ready-made gap completion exercise (<http://testyourenglish.pl/test-76>). Next, the learners were given handouts which contained five situations and words to be used to write sentences in the second conditional (e.g. *I don't have any money because I don't have a job. (If I / have / a job / I / have / some money)*). The activity was then checked by the teacher, who asked some of the students to read the answers.

During the third lesson, the subjects in the treatment group were first asked to do one multiple-choice activity and two fill-in-the-gaps exercises and then the learners were requested to log on to a browser-based virtual world *Yoowalk* (<http://www.yoowalk.com/>). After that, the students were provided with a handful of example questions in the second conditional and were encouraged to use them in order to talk to the residents of the virtual world.

When it comes to the last lesson, it commenced with one multiple-choice activity and two sentence completion exercises available at the following addresses: http://www.englisch-hilfen.de/en/exercises/if_clauses/type_2_mix3.htm, http://www.englisch-hilfen.de/en/exercises/if_clauses/type_2_statements.htm and http://www.englisch-hilfen.de/en/exercises/if_clauses/type_2_negation.htm). Next, they were asked to enter *Yoowalk* and conduct a questionnaire among its residents. In order to accomplish the task participants were requested to use the questions from the previous lesson or create their own ones and asked to answer them in full sentences. It has to be added that the second, third and the fourth lesson began with revision of the previously acquired information related to the second conditional and checking homework assignments. In addition, each class finished with giving the students relevant homework assignments.

As mentioned above, the control students did not receive any treatment concerning the second conditional. They would follow successive units of their coursebook during their English classes. It was presumed that the inclusion of the control group not instructed in the use of the

second conditional would demonstrate that the results were due to the innovative treatment, and not, for example, the outcome of learning the targeted structure on successive tests.

3.5. Data collection instruments, scoring and analysis

Three different types of data were collected: information gathered by means of the background questionnaire, the scores of the pretest, immediate posttest and two delayed posttests, and the qualitative answers from the evaluation sheet. The questionnaire was used to provide background information concerning the subjects' learning history, access to the Internet and type of exposure which might prove useful while interpreting the results of the research project. The evaluation sheet was intended to obtain the students' views on the activities and lessons. Both questionnaires were presented in Polish and filled out anonymously by the participants in their own time.

The test consisted of three tasks. The first one required the students to complete six sentences with the correct form of the given verbs. It should be noted that the task comprised two statements, two negatives and two questions, as well as it included 6-7 irregular verbs. The second task was a typical multiple-choice exercise and contained six sentences each accompanied with three possible answers. Finally, the third task required the students to spontaneously answer five questions (e.g. *What would you do if you lost your keys?*). In addition, the subjects were required to answer them in full sentences and to begin their answers with 'if'. It has to be noted that on each occasion the test was administered, it was possible to score a total of 28 points for it (i.e. one point for each correct answer).

What is more, three different versions of the test were created (referred to as version A, B and C) in order to minimize the likelihood of the practice effect to occur. It should be emphasized that the three versions of the test were different in their content, although they were identical in format and contained comparable tasks and levels of difficulty. In addition, on each occasion the students were divided into three groups and were requested to use the three versions of the test. More precisely, while one third of the students worked on version A on the pretest, the second third completed version B and the last third received version C. As for the immediate posttest, those students who had been provided with version A on the pretest worked on version B, the learners who then completed version B received version C, and those who had been supplied with version C were presented with version A. The tests were mixed up once again on delayed posttest 1 so that each subject could receive the version of the test she or he had not worked on before.

For delayed posttest 2, the original distribution was restored, with the learners completing the same versions of the tasks as they had had in the pretest (see Pawlak, 2006, p. 380).

The results of the test were subjected to quantitative analysis, which involved computing the mean score, the percentages of the mean score, and the standard deviation. The statistical significance of the differences in the means between the treatment and control groups on the successive tests was established by means of independent-samples *t*-test. The test was conducted using the Statistical Package for the Social Sciences (SPSS for Windows). The significance value was set at $p \leq .05$. Effect sizes were also established by calculating the values of eta squared. The following interpretation of eta squared was used: 0.01 = small effect, 0.06 = moderate effect and 0.14 = large effect (Dörnyei, 2007, p. 221).

In order to make sure that the production tests were scored consistently, randomly chosen samples of the data originating from the pretest, the immediate posttest as well as the delayed posttest 1 and 2 were assessed by a qualified English teacher. The results were then compared to those obtained by the present author with the purpose of determining inter-rater reliabilities which proved to be quite large in all cases since the lowest value of the Pearson Correlation Coefficient amounted to 0.995. In addition, the researcher reanalyzed samples of randomly selected data derived from the tests so as to control for consistent scoring of the test over time. The intra-rater reliabilities computed in this manner were high since the lowest value of the Pearson Correlation Coefficient equaled 0.997. In addition, the reliability of the instrument was determined on the test results and it turned out to be high, as evidenced by the value of Cronbach's alpha obtained ($\alpha = .89$).

4. Research findings and discussion

As evidenced by the pretest (PreTest) data presented in Table 1, there was a difference between pretest means for the two groups. Because of this, an independent *t*-test was conducted on these pretest scores to check whether this difference was significant and ascertain that all the subsequent effects were due to the study's intervention and not simply the results of an original inequality in scores. This test showed that the initial difference was very small ($t(25) = .485, p = .632$), which meant that there was no statistically significant difference between the performances of the groups. On the basis of this test, it was concluded that any differences in subsequent analyses were not due to prior between-group contrast. As can be seen from Figure 1 and Table 1,

a huge and statistically significant difference between the treatment and the control group on the immediate posttest (IPostT) was observed, which amounted to 12.51 or 44.67%, $t(25) = -4.622$, $p < .001$, $\eta^2 = 0.460$. What is more, instead of diminishing over time, the gap between the groups actually widened to 12.85 points (45.89%) on the delayed posttest 1 (DPostT1) and only shrank a little bit on the delayed posttest 2 (DPostT2) (10.71 or 38.25%). Each time the difference in the means was highly statistically significant: $t(25) = -5.164$, $p < .001$, $\eta^2 = 0.516$ and $t(25) = -3.632$, $p < .001$, $\eta^2 = 0.345$ on DPostT1 and DPostT2, respectively. It should also be added that the statistically significant results for treatment were characterized by large effect sizes, which meant that 46% (IPostT), 51% (DPostT1) and 34% (DPostT2) of the total variability in scores were due to the treatment factor.

Figure 1. Means for the treatment and control group on the test.

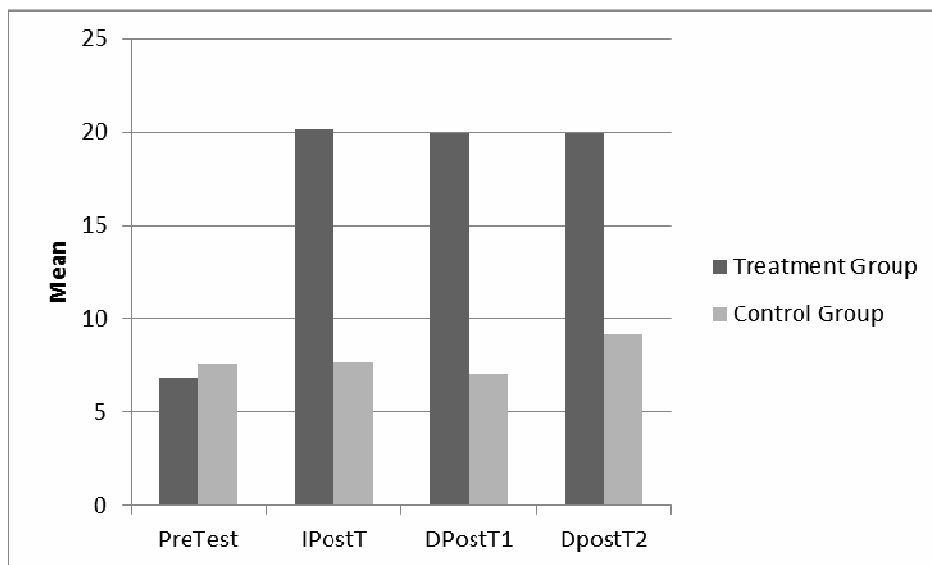


Table 1. Means and standard deviations for the treatment and control group on the test.

Test	Groups			
	Treatment (n = 13)		Control (n = 14)	
	M	SD	M	SD
Pretest	6.85	4.02	7.57	3.76
Immediate posttest	20.15	6.84	7.64	7.20
Delayed posttest 1	19.92	7.64	7.07	5.14
Delayed posttest 2	19.92	6.84	9.21	8.34

As can be seen from numerical data included in Table 1, the values of standard deviations were quite high and they changed over time for both groups. The smallest difference between any two standard deviations equaled 2.82 and 1.38 points for the treatment and control group, respectively. At the same time, the largest difference between any two standard deviations amounted to 3.62 and 4.58 points for the treatment and control group, respectively. What is more, standard deviations in both groups were higher on the posttests than on the pretest. However, the control group stood out against the treatment group, whose standard deviation was the highest on delayed posttest 2. Generally speaking, the treatment did little to level out the differences between the subjects in the use of the second conditional, although no treatment increased them even more.

Some of the results of the test which have just been presented may seem quite surprising. First, while the lack of any substantial progress in the case of the control group was to be expected, given the fact that it received no instruction concerning the target structure, the superior performance of the treatment students after the treatment may also at first glance seem unexpected, given the subjects' perception on grammar before the experiment got under way. It has to be remembered then that the majority of the treatment learners considered grammar as the most difficult area for them to study and only two subjects regarded grammar as their most favorite subsystem to master. However, the remarkable turnaround that was observed in the posttesting can testify to the effectiveness of the treatment provided.

The possible benefits of the treatment employed are also visible in the treatment students' opinions of the classes. The analysis of the evaluation sheet revealed that nine subjects regarded the lessons as interesting and three as very interesting; for five students the study of the second conditional was easy and seven learners said it was OK. In addition, all treatment students claimed that the classes definitely helped them to master the target structure. What is more, two and ten subjects liked or liked very much the online activities they were requested to perform, while six and five students regarded the virtual world as very useful or useful in studying the second conditional. Such findings, once again, point to the beneficial impact of the instruction in the form of the application of Internet-based resources and the browser-based virtual world on the structure in question. They also point to the usefulness and attractiveness of such resources in teaching foreign language grammar.

5. Conclusions, implications and directions for future research

The results of the study demonstrate that the use of online activities and the virtual world proved to be effective in aiding the treatment students with getting greater control over the second conditional, with such benefits being observable not only immediately after the treatment but also after it. Beyond doubt, such results speak to the effectiveness of computer technology, and provide a justification for its implementation in the course of teaching the target language subsystems such as grammar. The results of the study also indicate that the use of computers in teaching English grammar can be beneficial for students who have problems with grammar and those who are not motivated to learn it.

On the other hand, it is reasonable to assume that the improvement in the treatment group could have been partly reinforced by the subjects' working with the structure in question at home and in their own time. The beneficial outcomes of the study might also have been the result of the innovation effect or the fact that the students may have had increased motivation and attention to task simply because they were experiencing something different. It should also be admitted of course that the lack of a group of students instructed in the structure in question by means of traditional techniques and resources, e.g. coursebook exercises, might prove to be useful for comparison of the results.

Taking into account the realities of foreign language teaching contexts such as the one in Poland, where students are rarely, if at all, exposed to real language during classes and they themselves seldom seek contact with native speakers or speakers of the target language outside school, it seems necessary for teachers to provide their students with opportunities to use the target language in circumstances which could resemble natural settings as much as possible. This is because teaching a foreign language in schools and classrooms in countries where the target language is not spoken on an everyday basis will always remain highly artificial despite efforts on the part of the language teacher to create conditions in which students could feel part of the world where the language they study is spoken. What is more, various techniques to incite language learners to use the target language in more or less controlled activities and attempts to simulate real language use suffer from the lack of reality. This, in turn, might pose problems in terms of both perception and comprehension of such a learning reality for at least some learners.

Thus, it would be unsound or even deleterious to prevent language learners from placing them in a virtual world which they might perceive as a reflection of a natural setting and use the

target language in lifelike situations. This does not mean that virtual language learning and virtual worlds as such have to be applied at all costs in grammar instruction and that all traditional attempts to teach a foreign language grammar have to be abandoned altogether. It means, however, that teachers should seek opportunities to implement these virtual environments in their teaching practices whenever deemed appropriate and feasible. What is more, as suggested by Pawlak (2007, p. 187), the teaching of a particular grammar feature should no longer be viewed in terms of single classes, but, rather, involve a sequence of lessons, as was the case with the treatment applied in the study described in the present paper.

The main strengths of the study reported in the present paper are connected with the fact that it involved an intact group of students performing online activities and using a virtual world available for free on the Internet as part of their regularly scheduled instruction. Promising as they might be, the overall positive results have to be viewed with caution in the light of the fact that although the treatment students benefited from the intervention to a greater or lesser extent, it did little to eliminate inter-subject variation and, in fact, aggravated the problem by making the group more diverse in this respect than it was prior to the treatment.

In addition, the study also suffers from some other weaknesses that should be addressed in future empirical investigations of the role of the Internet and virtual worlds in teaching a foreign language grammar. These might be related to (a) the relatively small number of participants, which considerably reduces the generalizability of the results, (b) the fact that the intervention was of limited duration, and (c) the completion of the grammar tests which required the participants of the study to perform a similar set of exercises in a relatively short time separating the measures, thus increasing boredom and the likelihood of the practice effect.

Since the study was carried out in the Polish educational context and among senior high school students, there is a need for further studies comparing the value of virtual worlds or virtual environments in teaching the target language grammar in various types of schools as well as involving younger and older learners representing different levels of language proficiency. In addition, the effectiveness of such instruction should target a variety of grammatical structures and both cross-sectional and longitudinal studies should be designed to investigate them. Finally, research projects should make use of various types of data collection instruments as well as quantitative and qualitative data analyses should be applied. It is the belief of the present author that only by accumulating empirical evidence of this kind researchers can ultimately verify the

recommendations provided by theorists and researchers and confirm the effectiveness of virtual worlds or environments in grammar instruction.

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