Design of a Cybertask for Undergraduate Students: The Influence of Learning Styles on Task Completion

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Abstract. Learning styles play a significant role in language teaching and learning (Robertson & Nunn, 2013) in relation to task completion. During the past decade, numbers of studies have demonstrated the importance of learning styles in language learning (Pei-Shi, 2012); although little attention has been paid to the influence of learning styles on task completion (Girón-García, 2013). For the purpose of our present study, this work has been based upon the examination and description of a pedagogical activity (also called ‘Cybertask’) with a group of university students selected from the English Studies degree at ’Universitat Jaume I’ (Spain). The results obtained lead us to suggest interesting concepts such as ‘Successful Task completion’, ‘Style-switching’, ‘Style-blending’, and ‘Learning trait’, which we may consider as relevant to teachers making learners more independent and more effective in their language learning process.

Keywords. Cybertask, learning styles, learning trait, successful task completion, style-switching, style-blending.

1. Introduction

Higher education in general, and undergraduate students in particular, face the challenge to deal with an environment in which both print and digital information meet. In this sense and due to technological advances, undergraduate students will probably need to learn how to manage different sources of information in the Internet through online tasks. Along this line, we cannot deny the potential of the Internet, since multimedia technology (i.e. images, videos, sound, etc.) makes of Internet the perfect vehicle of transmission for real language and culture. However, it is important to mention the growing relevance of cybergenres, which started to be a focus of attention with Shepherd and Watters (1998). The introduction of realia would become an important aspect to be taken into account, since realia are believed to be the most convenient kind of material to promote language learning due to their discursive and cultural context. Additionally, these aspects also afforded the opportunity to take into account learners’ strategies and their learning styles in order to make language learning more efficient and in order to produce a positive effect on learners’ language use (Wenden & Rubin, 1987; O’Malley & Chamot, 1990; Cohen, 1998).

The use of the Internet and the selection of materials for pedagogical purposes should be done from a critical pedagogical perspective in order to obtain effective results in the language learning classroom. For this reason, the materials used for on-line activities should be taken from real-life resources and not manipulated at all for pedagogical purposes. Along this line, the purpose of this paper is to show how students’ learning styles influence in their task completion considering students’ learning strategies and styles in each one of the activities proposed in an on-line task-based activity, also called ‘Cybertask’. I first examine students’ choice of learning strategies in each one of the activities proposed in the ‘Cybertask’. I then discuss the resources employed for the design of an on-line task-based activity that highlights the teaching of “new literacies”, empowerment in terms of learning to write, and metacognition and degree of autonomy. And finally, I show how the students’ choice of learning strategies and learning styles...
affects in their successful task completion in the English Studies degree at ‘Universitat Jaume I’ (Spain).

2. Learning styles and students’ choice of learning strategies in task completion

2.1. Introduction

Enormous changes have taken place in modern foreign language teaching and learning (Robertson & Nunn, 2013) over recent decades which have seen emphasis shifting towards learners and learning rather than on teachers and teaching. Following from this idea and as we have previously stated, further investigation has shown the significance of language learning strategies in order to make language learning more efficient and in order to produce a positive effect on learners’ language use (Wenden & Rubin, 1987; O’Malley & Chamot, 1990; Cohen, 1998).

The attention given to learning strategies and learning styles arises from the need to show how successful learners have a whole range of available strategies to make language learning work for them and how they employ these strategies to process new information. Therefore, ‘learning to learn’ plays a very important role, since language strategies provide learners with what is necessary to make the most of their learning skills in order to manage their own learning. At this point, it is worth mentioning that ‘learning how to learn’ is also related to the term *adaptive learner*, a learner who is able to adapt his/her learning style according to the type of learning process and/or the type of task presented. But quite clearly, not all language learners use all learning strategies, since specific individual preferences may be understood in terms of individual learning styles (Reiss, 1981; Wesche, 1979).

2.2. Learning styles

Language learning styles and strategies are among the main factors that help determine how our students learn a second or foreign language. Students might use learning styles in the classroom setting in order to learn a subject or a foreign language. In this case, a student will show a specific type of behavior towards the language being learned, depending on his/her learning style. Furthermore, “learning styles are the biologically and developmentally imposed set of characteristics that make the same teaching method wonderful for some and terrible for others” (Dunn & Griggs, 1988: 3).

Following on from this idea we find pertinent highlighting the fact that an individual student may have different strategies belonging to different learning styles, if s/he faces different tasks or experiences (Villanueva & Navarro, 1997: 50). Thus, in this sense, there is no need to interpret neither learning styles nor cognitive styles as fixed behavioral schemes that predetermine students’ behavior. In fact, learning styles are characterized by a set of learning strategies that correlate in a significant way; however this does not imply that the same learner cannot experience learning strategies belonging to different learning styles.

2.3. Students’ choice of learning strategies

Both educators and language learners should be aware of the importance of learning strategies (Pei-Shi, 2012), since the adequate choice of some learning strategies facilitate the language learning process. The main idea is that learners should use those
learning strategies that (from their point of view) adapt better in their attempt to satisfy their learning needs depending on the type of task they face.

Among the many definitions found in the literature, we could probably mention that of researchers such as Scarcella and Oxford (1992), who define learning strategies as “specific actions, behaviors, steps, or techniques – such as seeking out conversation partners, or giving oneself encouragement to tackle a difficult language task – used by students to enhance their own learning” (1992: 63). When learners choose strategies that adapt to their learning style, these strategies become a set of tools that are necessary for language learning. Thus, there is general agreement that the use of learning strategies promotes learning, and that they constitute an important factor to be considered in the English as a Foreign Language (EFL) learning/teaching field.

Once strategies are identified, training and teaching to use good strategies should be carried out (Ellis & Sinclair, 1989; Poupore, 2008; Thurman, 2008). Thus, although learners have their own set of strategies, we deem it necessary to carry out some instruction on learning strategies. As a result of this instruction, learners are able to use a whole range of learning strategies and try to apply those ones that they consider that best adapt to their needs. But, we should bear in mind that learners will choose those strategies that fit better depending on the context, the task proposed, the learner’s age, etc. In fact, for the purpose of this work, depending on the task learners are faced with, they will choose a given learning strategy that best adapts for the purpose of that task. Bialystok, (1981) carried out some research on the relationship between types of task and learners’ language learning strategies choices. From that research, she found out that learners used different strategies according to the task requirement.


3.1. Methodology

The design used for the purpose of the present study is a qualitative case study. The case studies in this work are based upon the examination and description of a pedagogical activity with 23 university students selected from the 1st and 4th year courses of the English Studies degree at ‘Universitat Jaume I’ (Spain); although due to their interesting learning profiles only 6 were taken into account. In the design, each student was assigned a computer in order to carry out the task. Although all the students gave their permission to use their data, an individual identification code was provided in order to safeguard their privacy. Furthermore, their learning style was taken into consideration (Styles Questionnaire).

The main instruments for our study have been (a) the ‘Cybertask: The Writing Process’, as the main instrument for research, and (b) a ‘Learning Styles Questionnaire’ (http://www.giapel.uji.es/testestilos/Proyecto.html). This test is conceived in such a way that the student is able to choose strategies that belong to different styles. These learning styles are grouped into eight different pairs: (1) Active vs. Thoughtful, (2) Inductive vs. Deductive, (3) Visual vs. Verbal, (4) Cooperative vs. Individualistic, (5) Synthetic vs. Analytic, (6) Dependent vs. Autonomous, (7) Emotional vs. Rational, and (8) Positive attitude towards ICT vs. Negative attitude towards ICT. In this questionnaire, students are given the opportunity to choose those statements in the ‘Learning Styles Questionnaire’ that characterise their personal learning profile. To determine students’ learning profile, the results obtained are shown in percentages that express procedural
tendencies and allow describing a learner’s learning style with gradual and contextual criteria (Villanueva & Navarro, 1997). This questionnaire is designed so that within a multiple-choice set, a few questions indicate a variable and other questions the opposite variable. Finally, once the students have completed the test, the data are sent to a database management system.

We deem it necessary to mention that due to the relevance of the Cybertask proposed and Cybertasks as a proposal for the teaching-learning field, there is a need to focus on the following variables (see Table 1), which may have two variants:

- **Variable 1**: Active / Thoughtful. Using the language actively vs. Thinking about the language first and then speak.
- **Variable 2**: Synthetic / Analytic. Using several texts at the same time in order to get information vs. Analytical learners are also called sequential learners, because they like to take one piece of information at a time.
- **Variable 3**: Inductive / Deductive. Guessing the rules of the language vs. Having the language rule beforehand and apply it later.
- **Variable 4**: Autonomous / Dependent. Working on our own vs. Depending on other people to take responsibility for our work.
- **Variable 5**: Positive attitude towards ICTs / Negative attitude towards ICTs.

### 3.2. The cybertask model

For the present study, we have decided to take into account an on-line activity, adapt it to the university context and we have called the result ‘Cybertask’. Furthermore, in our own specific context, this design (a) promotes new literacy skills, and (b) makes the most out of such an activity for the development of language learning autonomy in ICT contexts. Apart from these, this Cybertask model includes other aims: on the one hand, the main learning aims of this Cybertask are the following:

1) Carry out an Internet search in order to gather information concerning the writing process.

2) Acquire new knowledge using some Internet links provided by the teacher.

3) Focus on meaning rather than on form or content, writing thus meaningful answers according to the students’ objectives and depending on the activities proposed in the Cybertask.

4) Metalanguage: Think about our own language learning in order to learn how to guide it on our own.

On the other hand, the students’ aims of this Cybertask are to complete a final task (activity 6), where they have to organize information in a graphic organizer in order to write an essay.

The Cybertask “The Writing Process” contains a total of six activities, as we illustrate in the digital version presented to the students in Figure 1 (Cybertask activities) below:
Along this line, we will discuss the skills that have been involved in each of the activities of the Cybertask. These skills will help us justify the students’ grade in each of the activities, and regarding the purpose of our present study, the results obtained in each of the activities will determine to what extent Learning Styles affect successful task completion. Along this line, we illustrate below the skills involved in each of the activities of the Cybertask (Girón-García, 2013: 214-222).

**Activity 1:** In view of the brief introduction given above, what do you expect to learn from today’s class? Write a few lines giving your own point of view (5 points)
- Metalanguage refers to the use of language to make statements, thus, ‘metalinguistic competence’ looks at explaining how to transmit linguistic knowledge in order to learn how to learn.
- Previous knowledge is necessary to adjust the present knowledge to create/build new knowledge, that is, being able to relate new information to what we already know (background information).

**Activity 2:**

**Activity 2.1.** In the light of the information found in the different websites, why is writing an essay so frustrating? (5 points)
Cognitive strategies: how students apply certain cognitive strategies when they have to search information on the net.

**Activity 2.2.** Try to find two graphic organizers that you like the most and give reason of your choice (5 points)
- Learning awareness (cognitive and metacognitive awareness): Students are supposed to choose two graphic organizers, relating those graphics of their choice to their own way of schematizing the information. Accordingly, they have to imagine how they would use those graphics for a future writing.
- Autonomous, analytic and thoughtful learning abilities: With this activity, ‘autonomous’ learners are able to make decisions and justify them; analysis and thoughtful strategies are expected to be manifested because students with these profiles are supposed to obtain better results. Accordingly, analytic students choose details in
the information they find on the Web, and thoughtful students think and plan about the details of the information.

**Activity 3:**

**Activity 3.1.** Try to define and explain the importance of the writing process (5 points)

- Metalinguistic competence aims at ‘know how’ to use specific language concepts and expressions (in English).
- Synthetic capacity through ‘skimming’ and ‘scanning’ techniques. By ‘skimming’ we understand the ability to identify a topic or a piece of text and determine and remember central ideas or key words from general information. On the other hand, we refer to ‘scanning’ as a selective comprehension; in other words, look quickly over the information on the Web looking for specific words or expressions.

**Activity 3.2. What civilizations were the first to use writing? (5 points)**

- Synthetic capacity (‘scanning’): Students have to look for concrete information in order to answer this activity. This capacity would be related to analytic students, since this type of students prefer considering specific details.
- The thoughtful component is important to answer this activity because it determines the students’ capacity to find out in the Web pages proposed what information is necessary for them.

**Activity 4: According to the information gathered on the net, how many drafts are considered necessary before giving a final copy?’ Justify your answer (5 points)**

- The autonomous capacity would be related to a profile of student capable of making critical decisions (decision-making of their own learning).
- Thoughtful capacity: The student has to know how to justify his/her choice (amount of drafts that are considered necessary) to answer the activity.
- Synthetic capacity (‘scanning’): Students are expected to look for concrete information to answer this activity.

**Activity 5:**

**Activity 5.1.** Identify and write the main steps that according to the resources should be used when writing an essay, report... (5 points)

This activity requires developing the same strategies as in the previous activity, except for autonomous and thoughtful strategies.

**Activity 5.2.** Would you personally use all the steps proposed, or maybe modify them or add some others? Justify your answer (5 points)

- Active or Thoughtful attitude: The active attitude is related to the pragmatic approach of a specific writing task when students have to make decisions about the steps involved in the writing process. Nevertheless, the thoughtful component is important to determine if students add or modify some steps and why.
- Autonomous capacity: Students develop decision-making of their own learning because they have to give a critical opinion of their choice.
- Metalinguistic competence: Students have to be able to manage the specific terminology employed when they have to talk about the steps involved in the writing process.

**Activity 6: Final Task (20 points).** Imagine that you have to write an article for your university newspaper about “recycling” (paper, batteries, plastic...). How would you organize the information of your article in a graphic organizer? Then write an essay about this topic.

This activity does not demand reading comprehension skills; instead it involves writing an essay (writing production). This activity focuses on two features: schematizing and writing.
**Graphic Organizer (5 points):**
- Analytic profile: Students have to make plans and organizational schemas with the aim of using them in the essay task.
- Thoughtful attitude: This profile is necessary to complete a graphic organizer because students have to think about how to organize the information about “recycling” that they are going to use later to write their essay.
- Coherence between the Graphic Organizer and the Essay: There should be coherence between the information that students write in the graphic organizer they have chosen and the essay they have to write in the second part of this activity.

**Essay (15 points):**
- General text coherence and cohesion (5 points): *Coherence* is adequacy of the text and semantic consistency. On the other hand, to what *cohesion* is concerned, we can talk about textual organizers to cohere a text (between lines, sentences and paragraphs).
- Semantic-pragmatic coherence (5 points): Students have to write an essay about “recycling” bearing in mind the adequate vocabulary around this topic, correct grammar, spelling, and the genre used (“newspaper article”) for the purpose of this activity.
- New knowledge (5 points): Students are expected to create new information about “recycling”.

After the completion of this Cybertask, students think about their own knowledge. Furthermore, they are asked to complete a Self-Assessment Questionnaire where they can make comments on the Cybertask’s process and result.

3.3. Web resources

In the Cybertask proposed, we offer different link resources where we can distinguish different types of genres. The main reason for the selection of the following resources lies in the fact that they all have one feature in common, ‘authenticity’. Real-life materials are pivotal in students’ academic education at the university because the way they learn in the classroom will be reflected in their professional careers. Following, we offer a brief description of each of these Internet resources:

1- Ten steps to write an essay *(The American University in Cairo)*: [http://www1.aucegypt.edu/academic/writers/](http://www1.aucegypt.edu/academic/writers/)
This Web page belongs to ‘The American University in Cairo’ (Egypt). The site offers information about the 10 steps students need to know to write an essay. Some of the steps offered in this page are: (1) Research, (2) Analysis, (3) Brainstorming, (4) Thesis, and (5) Outline… If students click on each one of these steps, they will have access to more developed information about the steps. This information will be useful to students in order answer Activity 5: Activity 5.1. “Identify and write the main steps that according to the resources should be used when writing an essay, report…” and Activity 5.2. “Would you personally use all the steps proposed, or maybe modify them or add some others? Justify your answer” (Cybertask). Furthermore, students can find the answer to Activity 2.1. “In the light of the information found in the different websites, why is writing an essay so frustrating?” (Cybertask).

This Web page is a school site for teachers that offers ideas for teaching the writing process. Considering that it is a school site, the information it contains is presented
clearer and more concise. Although there are many models and criteria for writing, in this page there are only 5 steps included: (1) Prewriting, (2) Writing, (3) Revising, (4) Editing and Proofreading, and (5) Publishing. The reason why this page contains only 5 steps may be due to the features of this site: ‘school site’. To conclude, students carrying out the Cybertask will use this page in order to answer Activity 5 (Cybertask).

3- The Purdue Online Writing Lab (OWL). (Purdue University, West Lafayette, Indiana): [http://owl.english.purdue.edu/](http://owl.english.purdue.edu/)
This Web page belongs to ‘Purdue University’ (Lafayette, Indiana, USA) and it is the most complex page regarding the ten resources that we offered to students. Due to the complexity of this site, there is a “site map” that provides the different types of resources (with headings and subheadings) in order to find in an easier way the information students need. Although it is the most complex Web page proposed to complete the Cybertask, it is probably the most complete, and as far as students are concerned, the most useful resource not only for the Cybertask’s objective, but also for their academic and professional careers. Among the several information students can find we highlight the following: ‘One-on-One Tutorials’, ‘Writing Workshops’, ‘Instructor Consultation’, ‘Email a Tutor’… Finally, students may use the information gathered in this page to answer Activity 5 (Cybertask).

4- The writing process (Rutgers University, Camden, NJ): [http://wire.rutgers.edu/process.html](http://wire.rutgers.edu/process.html)
The present Web page belongs to ‘Rutgers University’ (New Jersey, USA). Although the main page is that from the university, in this case, we did not want students to get lost in the information it offered, thus, we provided them the exact link to access the information that we were interested in having them identify. Therefore, the link is that of the ‘Department on English’ and it provides information about the writing process. Again, the different steps for the writing process are present: (1) Prewriting, (2) Planning, (3) Drafting, (4) Revising, and (5) Quick Check. By clicking on each of these steps, students have access to detailed description of each step, as well as examples and guidelines that help them in their writings. For the purpose of the Cybertask, students find this resource useful to answer Activity 5 (Cybertask).

Univision is a forum in Spanish, whose main aim is to comment on the process of writing in English language. People participating in this forum use both Spanish and English to communicate, thus, it is a resource of a great help especially for those people whose English level is not very good (probably with levels A1-A2). As in every forum, students have the opportunity to express their opinions and feelings about the writing process, as well as enrich themselves from other people’s comments.

6- Writing (Annette Lamb and Larry Johnson): [http://42explore.com/writing.htm](http://42explore.com/writing.htm)
The 42explore ‘Thematic Pathfinders for All Ages’ is a Web page created by Annette Lamb and Larry Johnson (university teachers now teaching online courses at ‘Indiana University-Indianapolis’, USA). More specifically, the main Web page is [www.42explore.com](http://www.42explore.com), which offers ‘General Themes’, ‘Social Studies’, and ‘Science’… But if we click on ‘Topic Index’ (on top of the page) we have access to different topics. In this case we chose that of ‘writing’. In this site students can find the answer to Activity 3.1. “Try to define and explain the importance of the writing process”.

8
In addition, this site provides more Web pages about writing, but they are far more specific like ‘fiction writing’, ‘parts of an essay’, ‘how to write an essay’, ‘kinds of essays’, and so forth.

7- The writing process (ORACLE ThinkQuest, Education Foundation): http://library.thinkquest.org/J001156/writing_process/writingprocess.htm

The Oracle Education Foundation is an organization that develops ‘ThinkQuest’, an online learning platform that helps students develop skills for the 21st Century like communication, critical thinking, and technology skills. With this resource, students solve real-life problems. Moreover, this organization gives access to its library: http://library.thinkquest.org/J001156/writing_process/writingprocess.htm. In this library, students are again provided with the steps they need to take in order to complete a quality piece of writing. In this case, the steps offered are the following: (1) Brainstorming, (2) Story Starters, (3) Graphic Organizers, (4) First Draft, (5) Revising, (6) Editing, and (7) Final Copy. By clicking on each step, students have access to detailed information on every step. Furthermore, if students click on ‘Brainstorming’ and then on ‘Writing’, they will be able to read about the different areas related to ‘writing’. At this state, by clicking on ‘History of Writing’, students will find the answer to Activity 3.2. “What civilizations were the first to use writing?”

Returning to the main menu and clicking on the third step of writing ‘Graphic Organizers’, students will be provided with a wide range of graphics (cluster diagrams, charts, story maps, cause and effect diagrams, outlines…) that students will choose for the answer of Activity 2.2. “Try to find two graphic organizers that you like the most and give reasons of your choice” and Activity 6 “Imagine that you have to write an article to your university newspaper about “recycling” (paper, batteries, plastic…). How would you organize the information of your article in a graphic organizer? Then write an essay about this topic”.

Finally, by clicking on the fourth step ‘First Draft’, students will not only read about what a first draft is, but also will find the answer to Activity 4 “According to the information gathered on the net, how many drafts are considered necessary before giving a final copy? Justify your answer”.

8- Writing (Lee’s Summit R7 School District): http://its.leesummit.k12.mo.us/writing.htm

Lee’s Summit is an organization that offers information and help on any domain, providing products and/or services. Lee’s Summit is owned and operated by ‘Hometown Solutions, LLC’, a privately held company located in Lee’s Summit (Missouri, USA).

Regarding the Cybertask’s objectives, as researchers, we have given students the direct access to ‘writing’ in the link http://its.leesummit.k12.mo.us/writing.htm in order to go directly to the information under request. In this page, students find information about rubrics to assess writing, 10 steps to write a research paper, paragraph organizer (getting started, about paragraphs, how to write a paragraph, tips and techniques), writing ideas… Furthermore, a wide range of graphic organizers is provided, which are very useful to answer Activity 2.2. and Activity 6.

9- Young authors’ workshop. Resource Pages. (Barbara Larochelle, University of Alberta, Canada): http://www.planet.eon.net/~bplaroch/index.html

This page was prepared by Barbara Larochelle as the final project for the course ED PSY 597 at the ‘University of Alberta’ (research public university in Canada). More pages are included inside the main page ‘Young Authors’ Workshop’, and for questions, comments or suggestions about those pages, people can e-mail to Barbara Larochelle.
The page offers a table at the bottom with the links for that step of the writing process: (1) Ideas, (2) Writing, (3) Revising, (4) Editing, (5) Publishing, and (6) Teacher resources. By clicking on each step, students find a brief description of that step, as well more links to identify more ideas related to the step in question. Apparently, this Web page is quite simple and it is easy to identify the information that students need to answer Activity 5 (Cybertask).


This last resource is a blog called ‘The Writing Site’. It offers information on several categories like ‘Blog Writing’, ‘Book Writing’, ‘Business Writing’, ‘Essay Writing’, ‘Online Writing’, and ‘Writing Style’… By clicking on each of these categories, students find information that can use for Activity 6. For example, if students click on ‘Writing Style’, they can be provided with tenses in English grammar, some particularities of the English language like ‘Enquire vs. Inquire’, and so on. Finally, all this information is useful for students in order to write the essay in the final task of the Cybertask (Activity 6).

All these links offered in the Cybertask are great resources for students, since they might contribute in their choice of some links depending on the students’ own objectives and preferences for the Cybertask completion. Furthermore, students should have their own criteria and creativity in their learning environment, and more specifically for the Cybertask completion. This feature is of paramount importance since learners create a personalised learning context depending on their learning style.

3.4. Learning styles results and discussion

In Table 1 (Learning Styles Results), we illustrate the different variables (see section 3.1) presented. Each variable describes each one of the pairs (composed of opposing values) of gradual tendencies that characterise the styles. These gradual tendencies do not exclude each other in each pair. In addition, the table reflects the number of students (6 case studies), which have obtained a high percentage in each of the values.
<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>VARIANTS (Learning Styles)</th>
<th>NUMBER OF STUDENTS</th>
<th>STUDENTS</th>
<th>RESULTS (Percentages)</th>
</tr>
</thead>
<tbody>
<tr>
<td>V1</td>
<td>Active</td>
<td>5 students</td>
<td>al205270, al227924, al118216, al121323, al118191</td>
<td>100%, 75%, 75%, 50%, 75%</td>
</tr>
<tr>
<td></td>
<td>Thoughtful</td>
<td>1 student</td>
<td>al074451</td>
<td>66.67%</td>
</tr>
<tr>
<td>V2</td>
<td>Synthetic</td>
<td>6 students</td>
<td>al205270, al227924, al118216, al121323, al074451, al118191</td>
<td>100%, 66.67%, 33.33%, 66.67%, 66.67%, 100%</td>
</tr>
<tr>
<td></td>
<td>Analytic</td>
<td>0 students</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V3</td>
<td>Inductive</td>
<td>5 students</td>
<td>al205270, al227924, al121323, al074451, al118191</td>
<td>100%, 50%, 25%, 100%, 50%</td>
</tr>
<tr>
<td></td>
<td>Deductive</td>
<td>1 student</td>
<td>al118216</td>
<td>25%</td>
</tr>
<tr>
<td>V4</td>
<td>Dependent</td>
<td>3 students</td>
<td>al205270, al227924, al074451</td>
<td>66.67%, 66.67%, 100%</td>
</tr>
<tr>
<td></td>
<td>Autonomous</td>
<td>3 students</td>
<td>al118216, al121323, al118191</td>
<td>100%, 100%, 66.67%</td>
</tr>
<tr>
<td>V5</td>
<td>(+) ICT</td>
<td>6 students</td>
<td>al205270, al227924, al118216, al121323, al074451, al118191</td>
<td>100%, 100%, 100%, 33.33%, 100%, 100%</td>
</tr>
<tr>
<td></td>
<td>(-) ICT</td>
<td>0 students</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1. Learning Styles Results.
Regarding the results shown, \textit{(RQ) To what extent do learning styles affect successful task completion?}

The analysis of the data may lead us to redefine the concept ‘Successful Task Completion’, since the conception of this term could present a certain degree of ambiguity if we take into consideration the variability of assessment criteria. Therefore, we need to define this term from both the Researcher and the Teacher’s point of view. Thus, for the Researcher, ‘Successful Task Completion’ is

(1) Students’ ability to deal with learning processes by means of managing different sources of information and selecting information,

(2) Students’ ability to synthesise and take decisions about the use of that information and their ability to build new knowledge in the process of answering the different activities,

(3) Students’ ability to reflect through a coherent discourse, which implies bearing in mind the process and not only the result of the task.

(4) Students’ use of cognitive strategies that are related to each one of the activities and the strategies that we expected to be applied or used.

(5) Students’ ability for discussion.

In view of the Teacher’s Assessment in our study we observed that the criteria followed by this Teacher were the following:

(1) The correlation between the students’ answer content and the expected content of the correct answers.

(2) The correct use of language with regards to grammar and lexicon.

In spite of the diverse perspectives some aspects are shared by these two points of view. Thus, for both the Researcher and the Teacher, ‘Successful Task Completion’ encompasses the following aspects:

(1) Students’ writing skills both in the activities and essay proposed (activity 6 in the Cybertask),

(2) Students’ ability to understand texts and answer the activities proposed.

These two points of view (Researcher’s and Teacher’s) do not contradict each other, but they are complementary, and allow us draw more precise conclusions.

In order to find relationships between learning styles and ‘Successful Task Completion’, we will translate into qualitative terms the result of the Teacher’s Assessment, adopting the following point scale and taking as a reference the maximum of 60 points in the Cybertask: (a) ‘Successful’ (40-60 points), (b) ‘Medium’ (20-40 points), and ‘Failure’ (0-20 points).

If we apply this scale to our case studies, we get that students \textit{al121323} (42/60), \textit{al205270} (40/60), \textit{al118216} (41/60) and \textit{al118191} (44/60) achieved a successful result in Cybertask completion. On the other hand, students \textit{al074451} (38/60), and \textit{al227924} (31/60), achieved a medium result in the Cybertask.

The aim of the present work has been to examine the extent to which learning styles affect successful task completion. The results concerning students’ learning styles in relation to their success in task completion revealed that we do not have to interpret learning styles as fixed behavioural schemes that predetermine their behaviour. In other words, a single subject may manifest some learning traits belonging, theoretically, to different learning styles. Our Cybertask has shown that students with different learning profiles may complete a Cybertask successfully following different paths. The literature on the topic (see section 2.2) assumes that we should not attach a particular learning style label to each student, since learning styles are characterised according to the more or less frequent use of a set of cognitive and pragmatic strategies related to different aspects of learning. In fact, and according to our research, it is the blending of some
learning style traits (active and synthetic; thoughtful, synthetic, and inductive; active and analytic; inductive, motivated, and dependent) that explains the personal approach to learning and depending on the demands of a particular activity.

4. Final conclusions

The intention of this research is to study the possible relationship between the learning styles of university students and how those styles affect in their task completion.

We can draw some conclusions related to the relationship between learning styles and task completion:

Some activities demanded ‘style-switching’. Given the fact that specific tasks require style-switching, we found out that students did not try to switch their learning styles into those ones that some of the tasks proposed demanded (see Section 3.1).

After our study, we are aware that we could establish a distinction between ‘learning trait’ and ‘learning style’, which may apparently refer to the same idea but are in fact different. We refer to a learning trait when for example; a student has traits in the active or thoughtful learning style. For this reason, we cannot talk about learning style in absolute terms, but we should instead talk in terms of learning style traits, which in combination with other traits may constitute complex learning profiles or ‘style-blending’. In other words, this combination of strategies is what we call blended learning profile, which has an influence on how students solve a given task. Style-blending can be defined as a combination, mixture or synthesis of strategies that characterize a particular student learning profile.

Finally, we have verified that the Teacher’s Assessment is a traditional teaching model that focuses on the result; on the other hand, as researchers, we have paid attention to the task realization process when this procedure demands certain strategies (induction, synthesis, risk-tasking…) from the meaningful knowledge and meaningful action points of view. Thus, we can propose that there exists a result’s assessment and a process’ assessment, which do not share a unique point of view but they are complementary. Therefore, regarding assessment, we should point out that the evaluation in each of the activities of the Cybertask consists of: (a) task process and (b) task result. The Researcher plays a crucial role in the task process, as s/he has to reflect on how to evaluate this procedure. On the other hand, the Teacher also plays an important role since it is his/her responsibility to grade the students’ results, although the lack of a qualitative analysis of student’s strategies and discourse might lead to a partial assessment.

5. References


Issues Related to the Detection of Source Code Plagiarism in Students Assignments

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Abstract. Detecting similarity or plagiarism in the academic research publications, source code, etc has been a long time complex and time consuming task. Several algorithms, tools and websites exist that try to find plagiarism or possible plagiarism in those human creative products. In this paper we used source code plagiarism detection tools to assess the level of plagiarism in source codes. We also investigated issues related to accuracy and challenges in detecting possible plagiarism in students’ assignments. Results showed that such process or decision is not binary to make and that subjectivity is high. In addition, there is a need to tune plagiarism detection tools to give criticality or weights by users of those tools to categorize and classify different levels of seriousness for committing plagiarism.

Keywords. Plagiarism, code similarity, documents similarity, string search, information retrieval, and search engines.

1. Introduction

In the academic field, one of the major serious problems is the plagiarism problem. There are two major areas of possible plagiarism in the academia. Those include plagiarism in research papers, projects and publications. It also includes plagiarism that is especially applicable for students in the computer and information technology majors. This is the plagiarism in writing code or programs assigned by their instructors. Further, code plagiarism may take several possible forms. In some cases, students in the same class may copy assignments from each other. They may also get their code assignment from external public resources, especially the Internet. In some places, local companies may offer helping students partially or completely in those code projects. The Internet also includes several websites in which students can submit their code assignments and get help from experts through the web. In some cases, this may be offered for financial compensations, it can be offered as part of blogs or websites of experts for free. This link (http://www.ics.heacademy.ac.uk/resources/assessment/plagiarism/onlinesites.html) that is updated by University of Ulster contains a list of several websites that help students (or any person or business for that matter) in their code assignments.

Teaching some computer major courses without tasks, assignments and experiments that include programming is ineffective. On the other hand, instructors struggle to make sure that their students actually performed the tasks themselves without a significant or complete help from others. The Internet and the availability of many websites that can offer help makes it harder for instructors to find possible plagiarism as they will not only look for possible plagiarism among students in their course; they have to search through a vast number of websites, blogs, posts, etc. It may be argued that instructors can solve this through asking for new or different tasks all the time. This can be impossible and time consuming for instructors in courses that are time
consuming also in grading, looking for possible plagiarism, etc. especially when the number of students in such classes is large.

To help instructors in the speed and the accuracy of detecting possible plagiarism, several tools and websites are available: free, open source and commercial. In the following section, we will describe some of those tools.

1.1. Tools and techniques to detect code similarity

There are several examples of source code plagiarism tools. Focus in this section will be on: JPlag, SIM, and MOSS as a sample.

**JPlag**
While it is not the first source code web-based plagiarism detection tool, nonetheless, evaluations of the tool showed that it is reliable, available for free and easy to use in comparison with many other similar tools (Prechelt et al 2000, and Prechelt et al 2002). The paper of (Faidhi, and Robinson 1987) discussed an earlier code plagiarism tool where the tool includes a large set of metrics to compare among the different codes to judge possible plagiarism.

YAP (Yet another Plague) tool of (Wise 1992) discussed also a source code plagiarism tool. Wise released several enhanced versions of the tool later on. YAP itself was an enhancement of an earlier tool called (Plague). User of YAP is allowed to set the cut off percentage to consider the occurrence of plagiarism in the code or not.

**SIM**
This is a tool that is developed to detect code as well as text possible plagiarism, or even DNA string comparison (Gitchell and Tran 1999). The tool is original developed to compare C program codes. A similarity score algorithm is developed with a value between 0 and 1 based on the level of similarity between the subject codes.

**MOSS**
This is also another popular free code plagiarism tool. It supports different operating systems. The tool divided the code into several fingerprints and matching or similarity is evaluated based on the number of similar fingerprints between the evaluated codes.

1.2. Techniques to detect documents similarity

In this area, there are many methods to judge similarity between documents. A brute force approach will compare the subject document with investigated documents word by word. However, in most cases, such approach is time and resources’ consuming. In addition, such approach can be easily fooled through editing a small number of words in the document. A more effective approach depends or is based on metrics related to the documents such as the number of statements, paragraphs, punctuation, etc. (Grier 1981, Faidhi, and Robinson 1987). A similarity index is calculated to measure the amount of similarity between documents based on those metrics. Comparing the approach of taking the document word by word in comparison to statement or paragraph by graph for example can have several contradicting trade offs. On one side, word by word comparison can minimize the effect of changing one or a small number of words relative to the total document. However, this can be time consuming and word to word
document similarity may not necessarily mean possible plagiarism especially if the algorithm did not take the position of the words into consideration. Documents’ similarity can be classified in different categories. In one classification, they can be classified into: word based, keyword based, sentence based, etc. Sentence or paragraph by paragraph approach is also affected by several variances such as the difference in size between the compared documents and the amount of words edited in those statements or paragraphs.

Hashing algorithms are also used to measure documents similarity. Hashing algorithms are used originally in security to verify the integrity of an investigated disk drive and protected it from being tampered. Hashing can be calculated for a word, a paragraph, a page, or a whole document.

N-gram and Latent Semantic Analysis (LSA) approaches are also different algorithms used in documents’ similarity. The main drive behind using N-gram in evaluating similarity between documents is that similar words will have a high percentage of N-grams in common. In most experiments, n is selected to be two or three. For example, using n-gram for the word “software” and n to be 3, will give the following outputs: #S, #SO, SOF, OFT, FTW, TWA, WAR, SRE, RE#, and E## where # denotes a padding space. The number of possible bigrams is given by the equation: n+m-1, where n is the number of possible characters in the word or the string and m is the possible grams. In the previous example, n is 8, and m is 3 and hence the number of bigrams is 10. Several text similarity applications such as: information retrieval, natural language processing, OCR, spell checking, etc use n-gram in their text similarity decisions.

1.3. Semantic similarity

Measuring semantic is usually a harder task in comparison with measuring words’ similarity. In documents, semantic similarity between the two documents can be measures based on a similarity index that measures the number of similar words based on several possible algorithms. Statistical means such as vector space models can be also used to measure the amount of correlation between the two subject documents. A topological similarity method is usually used to measure similarities between ontological concepts. Examples of such methods include: edge-based, node-based, pair-wise, and group-wise techniques. In terms of tools, there are some popular tools that are experimented for semantic similarity. Examples of such tools include: Wordnet, MSR, UMLS, SenseBot, SenseLearner, GWSD, and FrameNet. Wordnet uses an extensive word-definition library or dictionary that can be queried for each word in the subject document.

2. Literature review

In this section, we will describe some papers related to plagiarism in general. Then in the second section, we will describe some of the papers dedicated to code plagiarism evaluation.

Manber presented approximate index concept to measure similarity between strings in different documents (Manber 1994). A tool called “Sif” is developed to find similar files in a large file system. He proposed the concept of approximate index to measure the similarity of character strings between documents, which was adopted later by many similar systems.

(Manber 1994) described using a finger print (or what they called anchors) and a fixed number of characters as a baseline to search for plagiarism. In a similar approach and rather than considering a fixed number of characters where changing one character may affect the whole
comparison, we decided to select 4 words as the baseline. An initial method is developed to calculate the most frequent words in a paper and use them as an anchor. This is of course after removing all generic words, prepositions, and any other words that are expected to be seen in any paper (i.e. abstract, keywords, “this paper”, etc). For each occurrence of those frequent words, the algorithm will take 4 words starting from frequent words, and then look in all subject documents for possible matches.

We compared using the most frequent words as anchors in comparison to all documents words. Comparison will be based on two criteria: performance and plagiarism detection. If sufficient number of baselines (i.e. 4-words statements are common to two files (under comparison) then this is a good enough evidence that the two files are similar in some way.

The tool we developed in this paper uses several different search algorithms. The first one searches for possible similar documents for the subject document through a directory of files. The other algorithm searches for similar documents through the Internet. Calculating similarity between documents does not require in many cases similarity in cosmetic attributes such as the file type, size, number of words, etc. He defined a checksum algorithm called “fingerprint” that is based on defining keywords in each document and parse a certain amount of characters starting from those keywords to calculate similarity. In that checksum, anchor words are used from which a certain number of characters is selected and compared among documents. Anchors are created through analyzing text from many different files and selecting a fixed set of representative strings. In somewhat similar approach, we used the most frequent words in the subject word to be our anchors from which the algorithm will start looking for possible plagiarism or sentences’ match.

Some papers tried to tackle the performance problem of finding plagiarism in documents through using indexing (Mozgovoy et al 2005). Such concept is utilized also in search engines for fast document retrieval.

Detecting possible plagiarism in source code is another relevant subject to this paper. In principle, searching for similarities between two code projects is similar to that of documents. However, some cosmetic changes to a source code (e.g. changing all variables, methods, classes’ etc names) can make the new code look different for a code plagiarism tool while in reality it is similar or identical. Based on this assumption (Baker 1993) defined two source codes to be similar if one can be obtained from the other by changing parameter, method, attributes, or classes’ names. He presented several algorithms to identify similar source codes.

We will be contrasting our findings with those obtained using the shingle and fingerprint techniques (Manber 1994, and Broder et al 1997). This technique depends on reducing each document to a series of numeric codes, such as hash codes, based on sequences of words. In the original paper, the authors suggested making each hash code of a group of 10 adjacent words, and moving the window by one word to create the next hash code. They then eliminate duplicates and, to reduce the number of values, save only those divisible by 25. If this is still too many, they save only the 400 smallest values. The advantage of using shingles to compare documents is that a simple set membership between two figures of integers can be computed very rapidly. Documents that match in all shingles are assumed to be identical and those that match nearly all shingles are closely related.

For code plagiarism, several papers are available focusing in this issue. Some papers discuss the development and evaluation of code plagiarism tools such as those mentioned earlier. Other papers focus on the experience of dealing with students’ code plagiarism evaluation. Several papers tried to compare between different source code analyses tools (e.g. Jun-Peng et al 2003, Maurer et al 2006, Kustanto and Liem 2009, Hage et al 2010, etc.). There are several popular tools
such as those described earlier that were the focus of such surveys or comparisons. There are two major criteria upon which such tools are compared. Those are accuracy and speed or performance. In terms of accuracy, metrics are used to measure the ability of those tools to successfully or correctly detect the occurrence of plagiarism. In such scenarios, failures can occur when such tools assume plagiarism while it’s not, or the opposite. Challenges arise in cases where it is difficult to judge plagiarism occurrence (e.g. semantic plagiarism). In terms of performance, it is important for such tools to complete the process in a timely manner. Testing a code project against several other projects, line by line can take a significantly long time.

3. Experiments and analysis

In an earlier paper (Alhami and Alsmadi 2011), we described our implementation of a tool for automatic grading for code homework. The tool is developed based on concept extraction to automatically grade each question in comparison with a typical answer for that question. Rather than looking for a specific answer, the typical answer, which is the baseline for each question that the grading process depends on, include keywords that are expected to exist in the answer.

This includes using JPlag code plagiarism detection tool to evaluate possible code plagiarism among students’ assignments gathered from actual submitted home-works. In Plagiarism, the divided the levels of plagiarism into several levels based on the percentage of similarity between the evaluated codes.

Following is a description of the evaluation experiment along with results analysis. Several code assignments are submitted from students. Students were from 3 different sections.

Task 1: First assignment for the first student section. Five students have submitted the assignments. Results showed that there is no clear plagiarism among student assignments and the percentage of similarity among all assignments in this section is limited to between 0% - 10%.

Task 2: First assignment for the second student section. Six students have submitted the assignment. Two cases of plagiarism in the level: 40-50%, 17 cases between 10-20 % and the rest are in the range of less than 10%. Figure 1 shows a summary of experiment for students’ assignments possible plagiarism in this section. The figure shows the similarity matrix among the different assignments.
Task 3: First assignment for the third student section. Two students have submitted the assignment. Ranges of plagiarism are between 30% and less. Figure 2 shows a summary of this task results.

Task 4: Second assignment for the first student section. Six students have submitted the assignment. Plagiarism levels vary between 60% and below. This is an average level of plagiarism where it can indicate that students are actually copying from each other or from the same source. Figure 3 shows a summary of those results.
Task 5: Second assignment for the second student section. Eight students have submitted this assignment. In this case, serious plagiarism occurred with levels higher than 60% (i.e. 64.8% and 99.7%). Summary of results is shown in Figure 4.

![Figure 4. Assignment 2, Section 2 Results Summary](image)

Task 6: Second assignment for the section three. Seven students have submitted this assignment. So far, this is the most serious case of plagiarism with several almost complete cases of plagiarism. Further, results showed that in some cases more than two students are copying from other. Results are shown in Figure 5.

![Figure 5. Assignment 2, Section 3 Results Summary](image)

Task 7: Third assignment for the first student section. Six students submitted the assignment. Figure 6 shows the results with a medium level of plagiarism.
Figure 6. Assignment 3, Section 1 Results Summary

Task 8: Third assignment for the second student section. Five students submitted this assignment in section 2. Results indicate a significant level of plagiarism among all students. This is somewhat a unique case in comparison to all previous assignments or cases. Figure 7 summarizes the results for Task 8.

Figure 7. Assignment 3, Section 2 Results Summary

Task 9: Third assignment for the third student section. Twelve students have submitted the assignment. Only 7 of those are displayed which showed possible plagiarism. Results in this section showed a significant, even complete, levels of plagiarism where some students are exactly using the code of others. Figure 8 shows a summary of Task 9 results.
Task 10: Fourth assignment for the first student section. Eight students submitted the assignments and results of five of them are showed for significant plagiarism. Results showed significant levels of plagiarism among student codes. Figure 9 shows a summary of the results of Task 10.
Task 11: Fourth assignment for the second student section. Only assignments of two students are evaluated. Figure 10 shows a summary of the results.

Figure 10. Assignment 4, Section 2 Results Summary

![Assignment Results Table]

Task 12: Fifth assignment for the first student section. Six of ten submitted assignments are evaluated for possible plagiarism. There is a significant level of plagiarism in some of those assignments in comparison to the others. Figure 11 shows a summary of the results.

Figure 11. Assignment 4, Section 3 Results Summary

![Assignment Results Table]

Upon manual review of the students assignments we found out that plagiarism detected by the tool can be classified under the following categories:

In some cases, the plagiarism detection is (false alarm) where the tool by mistake decided that some similar use of variable or method declarations is a possible plagiarism. We know that in programming or code, there are some parts that can be identical between all assignments and those are part of the programming language built-in names that will be the same in all tasks if they are used.

On the other side, manual detection of students’ code assignments showed that some students are clever in a since that they can mislead code plagiarism tools. This is as they change variable and method names while in reality the majority of the code among the different assignments is the same. However, such semantic type of plagiarism is still a challenge for all types of plagiarism detection tools.

On the third level of manual code plagiarism observation, our observations showed that code plagiarism tools that can a useful effective tool for instructors for initial location of possible high
plagiarism levels. While some percentage of error in plagiarism detection can be noticed, on the other hand, they are able to give initial indicators of plagiarism especially in cases where such plagiarism is high and obvious. Such task can be tedious and time consuming to perform manually.

4. Conclusion

In this paper, we evaluated the use of a code plagiarism tool for possible detection of code plagiarism in students’ assignments. Such task can be tedious and time consuming to be performed by instructors manually. In addition, there are two major categories of possible source of plagiarism. Those are the Internet and students’ team mates. In code plagiarism tools, there are two major criteria that are used to evaluate the performance of such tools. Those are accuracy and speed or performance. In most cases, those two quality attributes conflict with each other.

While code plagiarism evaluation for students’ assignments showed that code plagiarism tools may show false alarms in many cases, however, results showed also that such tools can be very helpful in initial investigation for possible plagiarism and they can be very effective useful tools for instructors in this field.

References


Text Generator: an Aid for Writing in the Tertiary EST Class

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Abstract. This paper analyses the development of teaching LSP (Language for Specific Purposes) as well as the introduction of technology in the classroom from the 60s onwards. This evolution has favoured the growth of ICT (Information and Communication Technology) tools, not always intended for the classroom but very useful to introduce tertiary level learners of ESP (English for Specific Purposes) into a real context. One of these tools is the text generator, meant for Spanish-speaking specialists of a field to assist in their writing. This linguistic tool has been created taking into account the principles of contrastive analysis, genre rhetoric and corpus linguistics. After reviewing the process of how it was created, there is also an exemplification of task-based activities that can be developed in the classroom using a text generator.

Keywords. ESP, ICT, contrastive analysis, genre rhetoric, text generator

“Someday, in the distant future, our grandchildren's grandchildren will develop a new equivalent of our classrooms. They will spend many hours in front of boxes with fires glowing within. May they have the wisdom to know the difference between light and knowledge.”

Plato (427 BC – 347 BC)

1. Introduction

Teaching EST (English for Science and Technology) at tertiary level encounters the general problems of teaching LSP (Language for Specific Purposes). The approach to LSP teaching has changed throughout the last fifty years focusing first on the language and later on the learner (Upton 2012), and together with the latest technological innovations in the field of the ICT tools, vast changes have taken place in the classroom. The lecturer can nowadays benefit from a wide range of ICT tools such as e-mail, blog, forum, Moodle, etc. Nonetheless, all their possibilities are not always exploited with a pedagogical intention. This paper introduces another tool, the text generator, developed by the ACTRES research group, and it shows its underlying linguistic principles – contrastive studies, genre rhetoric and EST –, how it was developed and how it could be used in a real context such as a tertiary level class of EST.

2. Teaching LSP/ESP

Teaching a language for a specific purpose is completely different from teaching a second language for general purposes. There are different factors that make it distinct, such as motivation, needs of the student, socio-cultural aspects as well as the use of specific terminology, grammar structures, etc.

The main factor is its purpose, the need of certain language for a particular aim (Huckin 2003) as could be “Spanish for tourism”. Both the language taught and the specific purpose make a cluster, for this reason there is a great need of teaching tools and materials (Upton
2012) because the combinations of language and purpose are endless and very different in each context.

Most of the time when we refer to LSP, the language referred to is English, this has made the acronym ESP also well known, and its use is often interchangeable (Belcher 2009). The reason for this is that “English is by far the most prominent language that non-native speakers are wanting, needing or expected to learn in particular contexts” (Upton 2012: 13) although there are also other emergent languages such as Spanish, due to the “economic and political development of Spanish-speaking countries in Central and South America” (Sánchez López 2010), or Chinese and Arabic (Kanoksilapatham 2012).

In the case of science and technology, English is the language used internationally, for example in conferences that are held outside English-speaking countries (Benavides et al 2003), this makes English a key element for Spanish tertiary students in the technical area. We will refer to it as EST (Trimble 1985), and this is the context in which this research takes place.

“Ideally, LSP teaching should be based on subject-matter content that is recognizably part of the student’s own discipline or in any case something the student knows that he or she needs to learn. This gives it face validity in the eyes of the student and is likely to increase the motivation to learn.” (Huckin 2003: 5)

This motivation should be enough in itself for tertiary students to be willing to learn EST, but the fact is that many of them (most of them from my personal experience) would not enrol an EST course unless it was compulsory to graduate. The relationship between EST and learners is somehow problematic, as they do not feel the need for learning a second language in their first year of university, they see the professional environment in the long distance and a language course is very much aside their “technical” interests. There is a wide range of negative attitudes towards the EST class, ranging from the attitude of the I-already-speak-English learner to the I-can’t-cope-with-English learner. The first attitude is the most problematic, as this learner shows very little or no interest at all, seldom attends to class, he/she doesn’t have an excellent mark and in the end he/she will question the whole course because it didn’t fulfilled his/her expectations. The other attitude described can be better handled if the learner has a positive attitude. The main problem the lecturer has to face is how to catch the attention of the latter and make the subject attractive. This usually implies paying particular attention to low-level learners and offering extra material and resources for them to practice. If the lecturer succeeds in helping them keep a positive attitude, they will finally pass the course, even with a good mark.

The relationship learner-language has changed its focus since the beginning of LSP as a field of applied linguistics in 1962 (Swales 1985). Upton (2012) establishes four periods from that point of departure. The first one is centred in identifying the specialized language in a specific context. At this time, there was a very close analysis on vocabulary and language structures (Halliday, McIntosh & Strevens 1964: 189). The second period would be around the mid 70s when the focus is moved to “language-using purposes of the learner”. This means that at that moment, communication skills are also taken into account as well as vocabulary, themes, etc. (Strevens 1977). The third period would be in the late 90s in which there is a shift to the specific needs of the learner including wants, skill/knowledge gaps, etc. And the language studied is not deconstructed into small pieces but the whole “discourse and the genres appropriate to these activities” are considered (Dudley-Evans & St. John 1998). After this turning point, there has been a change towards “finding out what the learner needs are” (Belcher 2009: 3), understanding the language use in specific contexts (Belcher 2004) and “developing or adapting materials and methods to enable needs-responsive instructions” (Belcher 2009: 3).
This shows the evolution from the dawn of ESP, when the centre was the language in itself, and then, step by step there has been a slow evolution towards learners and language in context. The role of the teacher at this point is that of a facilitator and the learner is the centre of the learning process (Huckin 2003: 11).

One of the things the teacher has to decide is how specific the language needs to be; this is called the narrow/wide angle (Jordan 1997). With a small group of learners it is easy to establish a narrow angle, and the teacher can focus on very specific content, which is usually motivating. But with heterogeneous groups there is no other option than a wide-angle perspective (Huckin 2003).

The challenge for today’s teachers is to empower learners and to help them to develop the skills, strategies and perspectives they need to “take responsibility for their own development as specialist insiders when they are no longer in the LSP classroom” (Upton 2012: 22).

3. Teaching with ICT

We can refer to Benavides et al (2006) to have an outline of the evolution of the use of the computers in the classroom. Around 1960s computers were introduced for the first time in the classroom, and then in the 80s the use of CALL (Computer-Assisted Language Learning) began to extend for manipulating words and phrases but with the added value of an immediate feedback for the learner. This is a prescriptive and passive kind of learning (Read et al 2011) and it doesn’t really make a difference with other traditional written material in its concept, the contrast is only made in its format. In the 90s, CD-ROMs were widely used, mainly for installing programs on the students’ PCs, but the use of it did not evolve much more. From 2000 to nowadays it is the use of the Internet that has taken the baton. Internet is a tool that provides material in the form of hypertext and multimedia, and this can be accessible via web pages. The main difference with software and CD-ROMs is that learners don’t have to care for anything, they just need a mobile device such as a laptop, tablet or even smartphone and an Internet connection. The rest would be provided by the web page and the tasks previously prepared by the teacher. Upadhyay (2006) states, “online learning is considered as the extension to distance and distributed learning. An important aspect is to customize learning for students and to make it available at anytime, anywhere”.

Mullamaa (2010: 39) has also explored the possibilities of the ICT and suggests, “web-based solutions offer the learners the possibilities for making the learning process more interesting and challenging”. As we have seen before, today’s teaching trends make the learner the centre of the learning process and ICT tools are a good resource for this purpose as most of the times the activities designed are task-based and “students benefit with behavioural objectives” (Read et al 2011). The problem these authors find is analysing what learners produce, which can be endless work.

The different resources that can be used in ESP are those general tools such as e-mail, forum, blog, course plan and calendar among the main ones. ESP can also benefit from those tasks designed specifically for second language acquisition such as on-line grammar and vocabulary exercises, texts to read and discuss, on-line dictionaries, multimedia material, etc. One more tool that can be added to the list is the text generator designed by the ACTRES project (Contrastive Analysis and Translation English-Spanish in its Spanish acronym), which will be described in detail later on.

There are different opinions about ICT tools, “some educationalists appreciate its values, others tend to be rather reserved to the option of having the electronic environment overtake

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1 See http://actres.unileon.es/ for further details.
"the classroom" (Mullamaa 2010: 38). Other teachers just don’t know how to integrate them in their work (Zabalza 2003).

As Mullamaa (2010: 38) points out, ICT supports the modern principles of learning and language acquisition: individualisation, interaction and motivation. Individualisation is reached by means of promoting the autonomy of the student. Having a set task with a deadline, and the means to do it when best suits students, makes them organise their time and duties and from an individual and personal perspective, this way they do not depend on the class, the teacher or the rest of their colleagues. This provides a high degree of flexibility, as the individual feels free to find the best time for doing the task. The interaction that ICT tools provide is virtual, as learners are working individually, they can exchange views and opinions with other learners on forums and blogs, and even pose a question to the teacher, learners don’t have to wait for the next classroom session or attend an individual tutorial to clarify it. ICT tools also provide extrinsic motivation, as learners don’t feel like it is “the old written method” for learning English.

On the contrary, disadvantages may also be encountered, for example when learners may find that there is no Internet connection, they may feel alone and with no immediate support, they may not take the task seriously (Sweeney 2010) and it may be difficult and time consuming for the teacher to design a task.

Nonetheless, as Díaz et al (2006) state, ICT tools can be used to achieve the three generic competences: i.e. (a) instrumental (cognitive, methodological, technological and linguistic abilities), (b) interpersonal (individual abilities, social interaction and co-operation) and (c) systemic (abilities and skills concerning whole systems). Teachers in general agree in keeping tasks simple, clear and well structured to have success. If students feel they can accomplish the task they will be motivated. This is what can be called the Occam’s Razor: keep it simple and you’ll achieve it (ibid.). As a final recommendation, Raišanen (2004) proposes to opt for real tasks, if learners feel the task has a real purpose, this would keep them motivated. ICT tools are not the panacea to all the problems the teacher and the learner may encounter in the EST classroom, but it is a handy tool that we can get profit from, and it still needs a great deal of testing to get the best of it.

4. Text generators

Text generators have been designed to aid professionals of a specific field with the composition of scientific and technical texts in English. There are different text generators for different purposes and they support the user (a speaker of English as a foreign language) throughout the composition process by offering the most appropriate suggestions where grammar is concerned. This is achieved by means of a user-friendly, productivity-driven interface. The text generator that will be treated in this paper is a Technical Instructions Generator (TIG), aimed to assist in the composition of home appliances instructions' manuals. The pedagogical applications of a generator of these characteristics for an EST class in the tertiary level will be shown in section 6.

4.1. Underlying principles

Before we see the text generator, it is crucial to know on which theoretical principles it has been based. The two main principles are contrastive studies and genre rhetoric.
Furthermore, because of the specific characteristics of the TIG, it can be added that the scientific and technological language is also another important area to be studied.

4.1.1. Contrastive studies

The first notion taken is James’ (1997: 3) Contrastive Analysis, which states that two languages can be compared based on the universal properties of language (Chomsky 1965: 35). These common characteristics of every language make the basis of an analysis of different realisations in different languages. There is a common deep structure to every language and this is the reason why we can translate from one language to another (Chesterman 1998: 32). It is Chesterman (ibid.) who gives us a methodology of investigation in “Contrastive Functional Analysis”. We have to begin looking for similarities in two languages, as well as different ways of expressing the same meaning. This kind of CA is also called “functional” in the sense that it is based on meaning and it follows the onomasiological pathway, from meaning to form (Bondarko 1991).

The implications of linguistics in teaching are therefore clear (James 1997: 141) as any study based on CA in two languages serves as a basis for making learners aware of language differences. For a CA of this kind two main steps should be followed, “first, there is the stage of description when each of the two languages is described on the appropriate level; the second stage is the stage of juxtaposition for comparison” (James 1997: 30). These different levels that are mentioned are those of the language, a language can be compared in terms of phonology, lexis and grammar. James states that this should be the ideal, to compare two languages at the same level, but sometimes, these levels need to be crossed, what is called “interlingual level shifts” (ibid.). Once we are sure what the object of the comparison is, then the “tertium comparationis” can be established (ibid.: 58). The TC can be a small unit of comparison but it can also extend into broader terms, Hymes (1972), for example, proposes to focus on the speaker’s communicative competence to make a linguistic enquiry, we are moving then from micro- to macrolinguistics.

4.1.2. Genre rhetoric

Genre rhetoric gives the perspective needed for a macrolinguistic analysis. As well as Hymes (ibid.), mentioned above, other scholars have taken this same point of view. Werlich (1983) in “A Text Grammar of English” takes the whole text as a point of departure, a top-down perspective, and not the bottom-up angle as other previous more traditional grammars. Halliday & Hassan propose a model in which no distinction is made between grammar and semantics, but identify the role of different linguistic patterns in terms of function creating meaning. This way a text can be studied attending to the pattern and, as we can find repetition of the same pattern in other texts we can name it a “genre” (1989: ix).

A genre has to take place under the same conditions; it is a similar communicative process that occurs in a social context. The social context can be analysed under three dimensions: “field”, “tenor” and “mode”. The field is what is happening; the tenor, the people who are taking part; and the mode, the part the language plays (Halliday & Hassan 1989: 12).

Different texts belong to the same genre when they have the same function and they are similar in structure, this makes a genre be recognizable (Swales 1993: 9) or what Bhatia expresses as “recognizable communicative events characterized by a set of members of the professional or academic community in which it occurs” (2004: 23).
Halliday & Hassan also postulate that language is functional, this means that it performs a task in context. The different words and sentences in the text build up a meaning; a text is essentially a semantic unit (1989: 10).

4.1.3. Language for Science and Technology

The area of LSP/ESP on which we are concentrated is LST (Language for Science and Technology). LST is a specialized language although there are different levels of specialization. These levels can be arranged from the most specialized, as the one between scholars, to the slightest specialized, as the language that we can find for the general public (Pearson 1998: 35-39; Buendía & Ureña 2010: 172). In a tertiary LSP/ESP class, a mid level of specialization is going to be found in the negotiation between lecturer and learner, although learners will have to face high level of specialization texts in a passive approach, and they should be able to produce at least low-mid specialized speeches and mid specialized texts.

The characteristics of LST are: precision, neutrality, economy and other resources. Precision is understood as a way of avoiding ambiguity. Neutrality is shown as personal opinions and subjectivity is rejected. Economy of the language is essential in LST, abbreviations, acronyms, symbols are very much used and it plays an important part in the syllabus of LST. The other resources previously mentioned are those referring to formulae, tables, charts, diagrams, etc. (Gutiérrez Rodilla 2005). Among the grammatical characteristics that can be found in EST, Dudley-Evans & St. John (1998: 77) enumerate: short and simple structured sentences, without subordination; avoidance of personal opinion, no use of exclamations nor other expressive resources and impersonal formulae such as the passive and nominalizations.

Besides this microlinguistic approach to EST, Trimble (1985) makes also an analysis of the rhetorical functions that can be found. These are: description, definition, classification, instructions and visual-verbal relationships. A tertiary EST syllabus should be built around these five functions.

<table>
<thead>
<tr>
<th>Description</th>
<th>Physical description</th>
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<tbody>
<tr>
<td></td>
<td>Function description</td>
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<tr>
<td></td>
<td>Process description</td>
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<tr>
<td>Definition</td>
<td>Simple/single-sentence definition</td>
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<td></td>
<td>Formal definition</td>
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<tr>
<td></td>
<td>Semi-formal definition</td>
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<td></td>
<td>Non-formal definition</td>
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<tr>
<td></td>
<td>Complex definition</td>
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<tr>
<td></td>
<td>Stipulation</td>
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<tr>
<td></td>
<td>Operation</td>
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<tr>
<td></td>
<td>Explication</td>
</tr>
<tr>
<td>Classification</td>
<td>Direction of the classification</td>
</tr>
<tr>
<td></td>
<td>Finding the members of a given class</td>
</tr>
<tr>
<td></td>
<td>Finding a class for one or more given members</td>
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<tr>
<td></td>
<td>Explicit</td>
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<tr>
<td></td>
<td>Full classification</td>
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<tr>
<td></td>
<td>Partial classification</td>
</tr>
<tr>
<td></td>
<td>Implicit</td>
</tr>
<tr>
<td>Instructions</td>
<td>Telling someone what to do</td>
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<td></td>
<td>Direct instructions</td>
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<tr>
<td></td>
<td>Indirect instruction</td>
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<tr>
<td></td>
<td>Instructional information</td>
</tr>
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<td></td>
<td>Explanations</td>
</tr>
<tr>
<td></td>
<td>Theory</td>
</tr>
<tr>
<td></td>
<td>Warnings</td>
</tr>
<tr>
<td></td>
<td>(or any other additional information)</td>
</tr>
</tbody>
</table>
Table 1. Rhetorical functions of EST (Trimble 1985: 20-21)

5. Design of TIG

The TIG has been centred on one of the previous rhetorical functions discussed: the instruction. The way a learner will face this function in a real context will be reading and producing written instructions manuals. For this aim, a corpus of 40 home appliances instructions’ manuals in English and other 40 in Spanish, with over 380,000 words, have been compiled in order to get the idea of how this genre is organized and what kind of language is the one used in the different parts of the text. These parts are named “moves”, “steps” and “substeps” after Swales (1993: 140-41). Once the corpus was studied, this is how the instructional genre was organized.

<table>
<thead>
<tr>
<th>Moves</th>
<th>Steps</th>
<th>Substeps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identification</td>
<td>Manufacturing company</td>
<td></td>
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<tr>
<td></td>
<td>Name</td>
<td></td>
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<td></td>
<td>Model</td>
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<td></td>
<td>Artwork</td>
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<tr>
<td></td>
<td>Elements</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Purpose</td>
<td></td>
</tr>
<tr>
<td>Objective description</td>
<td>Technical data</td>
<td></td>
</tr>
<tr>
<td>Functions</td>
<td>Installing</td>
<td>Installing stages</td>
</tr>
<tr>
<td></td>
<td>Operating</td>
<td>Operating stages</td>
</tr>
<tr>
<td></td>
<td>(Extra) tips</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dos</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Don’ts</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maintenance</td>
<td>Maintenance stages</td>
</tr>
<tr>
<td></td>
<td>Troubleshooting</td>
<td>Problem/solution</td>
</tr>
<tr>
<td></td>
<td>Safety information</td>
<td>Guarantee</td>
</tr>
<tr>
<td></td>
<td>Recycling</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Company information and Costumers’ service</td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Moves, steps and substeps of TIG

With the aid of the ACTRES tools, it has been possible to manage the great amount of data. The first step was to annotate the corpus according to the organization established (table 2). This has been done with the ACTRES tagger (figure 1).
Once this step has been done it was possible to extract the language of each move, step and substep with the ACTRES corpus browser (figure 2).
With this method the prototypical (Rosch 1978) language of each move, step and substep was established. The language offered in the TIG has been extracted from real texts that can be found nowadays in the market, it is a descriptive point of view of the language, not prescriptive. Taking this stage as a point of departure, the TIG can be used for helping learners to build an appliance instructions’ manual.
When opening the TIG learners have an outline of the different moves, steps and substeps of the instructions’ manual on the left hand. This is fully developed on the right hand. When learners start working on their texts they get a description in Spanish of the piece of text that is required. A menu is displayed with different suggestions on how to build up a sentence; there is a kind of “English skeleton” together with an explanation in Spanish on what is needed to complete it. To make it easier, each choice is accompanied by an example. Then, learners write their own sentences in the box. If learners don’t know the exact words in English, they can write it down in Spanish and they will get some English options from which to choose, this is a glossary of English terms. This process is repeated until the whole manual is completed. Once this is done, learners can go to “Vista previa” (preview) and have a look at the manual, if there is something that needs amendments they can go back and correct whatever is necessary. When the text is finished, it can be downloaded as pdf or doc document.

6. Advantages of using TIG in class

The following points will recapitulate what has been established so far and how the TIG is a tool that meets the last trends of ICT tools together with a solid theoretical background:

- To begin with, the TIG is a tool that focuses on a specific purpose of language, EST. For this reason it is aimed for tertiary level learners of English as a second language in a scientific and technical context.
- It meets the requirements of ESP teaching and learning. The role of the lecturer is that of a facilitator, and the learner is at the centre of the learning process. It empowers learners as experts of their own technical knowledge rehearsing in a real context. Do not forget that the TIG is not a pedagogical tool in its conception, but an aid for the professional of a specific field.
- It is focused not only on grammar and vocabulary but also on the discourse, the specific genre of a whole community of experts. From this point of view a narrow-angle perspective is possible to follow even with a large number of learners.
- As an ICT tool, it is at the forefront of technology, it is web-based, available everywhere at any time with an Internet connection device (PC, laptop, tablet…).
- It is an ideal tool for designing a task-based activity, which has been proved as a motivating resource in previous studies (Mullamaa 2010), in this case to write an instructions’ manual.
- It promotes the modern principles of learning and language acquisition: individualization, interaction and motivation (ibid.).
- It has been linguistically designed based on a solid theoretical background: contrastive studies (CA and CFA), genre rhetoric and EST.
- It has been designed on the basis of a linguistic corpus of real texts that can be found on the market at the present moment, taking a descriptive perspective, not prescriptive.

7. Use of TIG in teaching EST

Here, an example of task that can be performed in a tertiary EST class is presented. In appendix 1, the students’ task sheet is provided.

Task: Writing a home appliance instructions’ manual (lecturer’s notes)
Type of activity: Individual task with peer-assessment
Classroom requirements: Computer lab with Internet connection or students can bring their own laptops if Wi-Fi connection is available in the classroom.

Session 1
- Students find a real home appliance instructions’ manual in English. If you want students to bring it physically (on paper) to class you should warn them in the previous session. Alternatively, they can find one on the Internet with their own PC/laptop in the classroom.
- Make sure they do this individually and that they all have a different appliance. Check and comment on what they have found and give feedback. Depending on their level guide them to find a complex or simple appliance. For example, washing machines or dishwashers are good for high-level students; low-level students can do better with blenders or hair dryers.
- Set the next step to be done individually (either at home or in class, as best suits you): students have to imagine that they have invented a new appliance that substitutes/is better/more advanced than the one they have found and they have to write a new instructions’ manual for it. Students make a draft of the new characteristics and functions.

Session 2
- Make a revision about the characteristic language used in instructions’ manuals. See appendix 3 for reference.
- Show students how to use the TIG and make them practice for a while. Comment and give feedback.
- Establish pairs of students and make them take note of their partner’s email. Depending on the length of the session they can start working individually or you can set the task for homework.
- Establish a date on which students have to send their instructions’ manual to their partner together with the original instructions’ manual for reference (in case something needs checking). This should be done on a Word document; make them aware they should not introduce any restrictions to the document; no pdf or other restricted documents are allowed.
- Establish another date for students to give the feedback to their partners. They should write their comments using Tools > Track Changes in the Word document and send it back by email. Make clear that students cannot modify anything without leaving the trace. Make them also aware of the assessment criteria (appendix 2), what they have to look for, and what they should comment on. If necessary, post them on the Moodle, blog, etc. you use for exchanging information with the students.
- Establish a deadline on which students have to send you their final draft.

Individually (homework)
- Students get their partner’s feedback and decide which comments they incorporate and which comments they do not include in their final draft.
- Students send their final draft to the teacher. It is also very advisable to send your comments back to the students so they are aware of any improvement.

High-level students
For high-level students you can skip the first step of finding an instructions manual, they can design/invent their own home appliance, it does not matter if it is not technically possible
to make. This step can also be adapted to the different technical areas of the students; the invention can be mechanic, electronic, etc. The rest of the activity would be the same. You can introduce a final session for students to make an oral presentation of their inventions and explain the rest of the class how it works.

8. Conclusion

I have tried to analyse the surrounding circumstances of a nowadays EST tertiary classroom, the way the teaching approach to it has changed throughout the last half century and what are the new elements that have been lately introduced. One of these elements is the TIG. The development of the TIG has been made according to the latest linguistic trends such as contrastive studies, genre rhetoric and EST; it is not only a technical tool but also a linguistic one.

The main advantages of this tool in the EST class are: (1) its specificity, it is focused on technical language; (2) from a pedagogical point of view, the centre of the learning process is the learner, not the lecturer; (3) it promotes the modern principles of language acquisition: individualization, interaction and motivation; (4) writing is developed not only from a microlinguistic perspective, but also presenting the instructions’ manual as a genre and with a well established structure; (5) it uses the latest technology, it is web-based and available with an Internet connection; and finally, (6) students train in a real context, the TIG is not a pedagogical but a professional tool in its conception.

The last part of this research was developed from a very practical perspective. Of course this is not the only way the TIG can be used in an EST class, but this proposal is meant as an exemplification of how it can be exploited and it is open to more possibilities.

Acknowledgements

I am grateful to Dr Labrador de la Cruz and Dr Díaz Prieto for all their support as well as their valued comments on this paper.

Appendix 1 – Students’ notes for the task

Task: Writing a home appliance instructions’ manual

- Find a home appliance instructions’ manual in English. You can look for one at home or find it on the Internet. Bring it to class.
- Imagine that you are an engineer working for that company and you have invented a new appliance that substitutes, is better or more advanced than the one you’ve got. You have to write a new instructions’ manual for it. Make a first draft of the new characteristic and functions.
- When you have a clear idea, write your new instructions’ manual using the TIG. Save it as a Word document with no restrictions, no pdf is allowed. Send it to your partner together with the original instructions’ manual for reference.
- When you receive your partner’s instructions’ manual you have to comment on it following the assessment criteria. Do not comment on anything that crosses your mind and explain your comments to make them clear. Use the Tools > Track Changes tool.
in the Word programme to write them, be careful to leave a trace of any change that you make, do not change or delete anything directly. Send it back to your partner.

- Read you partner’s comments on your manual and accept those good comments and reject others if you think they are not appropriate. Send your final draft to the lecturer.
- Pay attention to these dates:
  - (date) – Send your instructions’ manual to your partner.
  - (date) – Send your feedback to your partner.
  - (date) – Send your final draft to the lecturer.

Appendix 2 – Assessment criteria

(The percentages are only illustrative)

Content (20%)
Is the invention presented original? Does it represent a great change with the previous appliance presented?

Text structure (20%)
Is the whole text coherent and complete? Does it lack any of the important parts of an instructions’ manual? Is the information balanced? Or, is there too much information/description about one thing and not on another?

Paragraph structure (20%)
Are the paragraphs well structured? Is there internal coherence of the paragraph? Or are there different ideas mixed together? Is there cohesion between one paragraph and the next one?

Use of language (20%)
Is the language used appropriate for the context? Too formal/informal? Are there any grammar problems? Is it correctly used? Are there any misspellings?

Oral presentation (20%)
Explanation of the content: Is it clear? Does the audience understand it? Attention to the audience: Does the student pay attention to the audience? Or is he/she just reading notes? Does he/she get feedback/interaction from the audience? Use of classroom tools: board, interactive white board, images, ppt… Speech: Is it clear? Fluent? Accurate?

Appendix 3 – The language of instructions

Instructions are clear and detailed information on how to do something, especially in written form. There are two types of instructions: direct instructions and indirect instructions.

Direct instructions
Direct instructions are characterized by the use of the imperative form of the verbs. Remember the imperative form of a verb is made with the infinitive without the particle “to”.
They are usually in the form of a numbered list; that is, a set of steps in the order in which they are to be done:

1. **Remove** all packaging, stickers or other accessories from the inside and outside of the kettle.
2. **Place** the appliance on a flat and stable surface.
3. **Fill** it with water…

For negative instructions, we use the auxiliary “do not” or “don’t” before the infinitive without “to”:

Do **not put** anything on top of the appliance.

Indirect instruction

Indirect instructions are characterized by the use of a modal verb. The modal verbs used are “should”, “must” or “can”:

You **must switch off** the appliance after use.

Impersonal instructions are also very common. The impersonal instructions are made with the passive of “should”, “must” or “can”:

The appliance **must be switched off** after use.

Instructional information

Instructional information helps the reader to better understand the instructions. It is always associated with either direct or indirect instructions. They add cautions, warnings, recommendations and suggestions, specifying statements, notes, etc.:

Check the main voltage before plugging it.

(Based on Dr Díaz Prieto’s notes)

References


The Effect of Practicing Extensive Reading through Web-Based Inquiry Learning Environment (WebQuest) on Intermediate EFL Learners’ Reading Comprehension and Vocabulary Achievement

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Abstract. Educators agree that Internet resources can be a valuable learning tool for students to find information and apply them in learning. Among many Web-based applications in education, WebQuests have become popular learning tools in English as a Foreign Language (EFL) reading because they provide learners with authentic tasks to motivate students’ investigation of a central, open-ended question. The purpose of this study was to investigate the impact of Extensive Reading through WebQuest on EFL learners’ reading comprehension and vocabulary achievement. For this purpose, 60 intermediate EFL learners were selected based on their PET scores and were divided into control and experimental groups. In both groups Extensive Reading was practiced; in the control group the learners had to read short story books, but in the experimental group the researcher introduced a WebQuest through which students practiced the same short story. At the end of the study, a vocabulary and a reading comprehension posttest was administered and the results were analyzed by MANOVA. The results indicated that WebQuest had a significant impact on the reading comprehension of the experimental group, but no significant difference was observed between the vocabulary mean score of the control and experimental groups.

Keywords. reading comprehension, vocabulary achievement, Extensive Reading, WebQuest.

1. Background and Purpose

1.1. Introduction

Reading is an important skill for English language learners in today’s world. It is by reading that language learners learn much of what they need to know in order to improve their general English. It supports the development of overall proficiency and provides access to crucial information at work and in school. Educational researchers have found that there is a strong correlation between reading and academic success (Pretorius, 2000). In other words, a student who is a good reader is more likely to do well in school and pass exams than a student who is a weak reader.

According to Shoebottom (2010), good readers can understand the individual sentences and can guess the meaning of many unfamiliar words from the context while they know most of the words in the text already. He also maintains that they can use dictionary effectively to help them understand the meaning of new words. Furthermore, he asserts that they can comprehend ideas, follow arguments and on the whole they can quickly extract from a text what is important for a task they are employed in.

Educational researchers have also found a strong correlation between reading and vocabulary knowledge (Alderson, 2000; Qian & Schedl, 2004; Zhang & Anual, 2008). For second language learners, vocabulary assessment can reveal the extent of the lexical
gap they face in coping with authentic reading materials (Read, 2007). In other words, students who have a large vocabulary are usually good readers. One of the best ways to acquire a large vocabulary is to carry out Extensive Reading as Day (2008: 1) puts it: “It is not surprising that Extensive Reading helps students become better readers”. Therefore, if one reads extensively, one is likely to become a good reader. Nowadays, with the progress of technology, computers have become a part of people’s every day tools. More and more people are using computers at work and home, and it seems impossible to avoid using computers. Computers in turn, have resulted in the advent of another technology, namely, the Internet. In this information age individuals receive huge amounts of information via the Internet with the click of a mouse. Castells (2001: 44) believes that, “we live in the Internet Galaxy”. In fact, “The Internet is not just a technology. It is the technological tool and organizational form that distributes information power, knowledge generation and networking capacity in all realms of activity” (Castells, 2001: 52).

In order to survive in this information age, one needs digital literacy. In this regard, Chatel (2002: 12) maintains that, “A literate person in the digital, information-oriented society knows how to gather, analyze, and use information resources to solve problems and make decisions as well as how to learn both independently and cooperatively”. Making use of the Internet as an informational and technological tool, WebQuests, developed by Bernie Dodge and Tom March in early 1995, are inquiry-oriented activities in which most or all of the information used by learners is drawn from the Web (Dodge, 1998).

Since the mid 1990s, educators have searched for ways to make effective use of the vast information resources available on the web. Mcnierney (2002) asserts that the WebQuest approach is a nontraditional instructional method for teaching subject area content through using multimedia and computer generated web-based instructional activities. WebQuests integrate the World Wide Web into classroom activities and encourage students to use higher order thinking skills to solve a real messy problem. According to March (2008), a good WebQuest prompts the learner to apply higher order thinking skills (analysis, synthesis and evaluation). Students are provided with online resources and are asked to use this information constructively to solve the presented problem rather than just cutting and pasting material into an assignment or project.

WebQuests are designed to use the students' time well, focus on using information rather than searching for it, and support students' thinking at the levels of analysis, synthesis and evaluation. Most schools cannot afford the time or resources required to allow students to browse the Internet without a clear purpose in mind, and there is doubtful educational benefit in doing so. WebQuests allow students to use the Internet without the arduous task of filtering through the mountains of information contained within it. Teachers have done this work already. As March (2003: 42) maintains, “The best WebQuests inspire students to see richer thematic relationships, to contribute to the real world of learning, and to reflect on their own metacognitive processes”.

In order to deal with information we must be able to read and understand it and even more importantly, to use it significantly (Albion & Maddux, 2007). According to Verhorven and Snow (2001, as cited in Barros & Amorim Carvalho, 2007), research shows that Extensive Reading may help develop reading skills provided that the students do the task successfully. They further maintain that reading demands not only a series of skills, but also motivation which plays an important role during the process. Barros and Amorim Carvalho (2007: 38) maintain that, “WebQuests can be balanced
and structured activities for an Extensive Reading task. They can be motivating, having the potential to help students look at Extensive Reading differently”.

Furthermore, according to Laborda (2009), although vocabulary is usually acquired through oral interaction, learners can improve their vocabularies through reading with WebQuest being a potential source for it. The Internet offers a unique opportunity for natural unmodified input that textbooks can seldom present. It has been claimed that technology such as WebQuests can provide opportunities for collaboration and the practice of integrated language skills such as reading, writing, and speaking (Kocoglu, 2010). Also WebQuests are claimed to be beneficial for ESL/EFL learners due to exposing the learners to authentic materials and meaningful content and providing the possibilities for real communication in the target language (Simina & Hamel, 2005; Stoks, 2002). Conclusively, the resources offered by the Web can be seized to build open and motivating tasks and bring learning near to the student’s classrooms.

1.2. Statement of the Problem

In everyday life, to read extensively means to read widely and in quantity. According to Smith and Elley (1997), pioneers such as Harold Palmer in Britain and Michael West in India worked out the theory and practice of Extensive Reading as an approach to foreign language teaching in general, and to the teaching of foreign language reading in particular. They further maintain that research has confirmed that Extensive Reading is beneficial to the learners in terms of increasing print exposure, writing ability, receptive and productive skills, and vocabulary acquisition. Nevertheless, one problem is that many students do not like reading in a foreign language. According to West (1955) and Dupuy, Tse, and Cook (1996), it has been widely observed that a consequence of traditional intensive approaches to foreign language reading instruction is that students do not actually read very much. According to Barros and Amorim Carvalho (2007), learners often find it a difficult task mainly due to the high number of unknown words they encounter when reading a text. Shoebottom (2012) maintains that another difficulty arises in cases where the necessary background knowledge is missing or learners lack motivation.

Szylnalski (2001), likewise, notes that one of the reasons why learners do not want to spend their time on reading is that they associate it with unpleasant things. He gives an example by maintaining that when they think ‘reading a short story’, they think about boring stories and poorly black and white printed and boring exercises. He also maintains that in their minds, this reading is something they have to do, not something they want to do. Number one of William’s (1986: 42) ‘Top ten’ principles for teaching reading is that “in the absence of interesting texts, very little is possible”. Therefore, it seems that merely providing reading materials is insufficient, rather according to Clarity (2007), reading needs to be associated with an enjoyable activity.

Today increasing access to the internet has brought the world into the classroom. Krajka (2000) holds that online instruction provides recency, variety and choice to the classroom. He also believes that online lessons add new flavor to the classroom and believes that internet instruction can spice the classes up with some new elements. Schmidt (1999) raises the issue of using the Internet as the source for the reading
supplement to the course. He further states that the Internet is indeed a great treasure trove of varied reading comprehension input. Furthermore, lack of sufficient vocabulary knowledge is consistently mentioned by students of all levels as the greatest problem they have in order to comprehend texts written in English (Pino-Silva, 1993).

Being aware of this deficiency, teachers, researchers, and material designers have struggled hard to think of methods or approaches to teach vocabulary in the context of reading pedagogy. The fact that sheer exposure to online texts might produce positive results in that direction, even if they were modest, is a strong motif to investigate whether using WebQuest can result in reading improvements and vocabulary achievement. Therefore, in this study the researcher intended to verify whether through Extensive Reading in a learning environment based on a WebQuest the students’ reading comprehension and vocabulary achievement would significantly improve compared to the usual Extensive Reading procedure.

1.3. Statement of the Research Question

This study sought to determine whether there was a significant difference between the Extensive Reading through WebQuest and books in improving the EFL learners’ reading and vocabulary achievement. To achieve this objective, the following research questions were posed:

Q1: Does Extensive Reading through WebQuest have any significant impact on EFL learners' reading comprehension?

Q2: Does Extensive Reading through WebQuest have any significant impact on EFL learners' vocabulary achievement?

1.4. Statement of the Research Hypothesis

In order to verify the above research questions, the following null hypotheses were generated:

H₀₁: Extensive Reading through WebQuest does not have any significant impact on EFL learners’ reading comprehension.

H₀₂: Extensive Reading through WebQuest does not have any significant impact on EFL learners’ vocabulary achievement.

1.5. Significance of the Study

English has become the world’s international means for communication or in fact, the world’s lingua franca. In effect, it is safe to say that it is difficult in today’s world to be active and successful in international business, politics, scholarship, or science without considerable competence in English. Levine, Ferenz and Reves (2000) assert that to cope with the competitive edge in the age of technology and information, an effective and efficient reading activity is the key to academic success.

One such effective means is the use of computers and the internet. Azimzadeh and Molaesmaeli (2009: 2) assert that, “Current advances in computer technology, having access to the internet, and fast pace of change in the communication revolution are affecting the ways foreign language teachers use the information technology to develop

the learner’s language skills”. Warschauer (1996) also suggests that research supports the use of electronic technologies in ESL/EFL contexts for the purpose of aiding the students to acquire the linguistics, social, and technological skills needed for successful communication in the age where communication seems to be difficult without resort to such technologies.

WebQuests as electronic technology “exemplify electronic constructivism and incorporate scenarios and tasks that go far beyond fact finding and reporting. When tackling WebQuest challenges, students engage in transformative thinking, combining their innate creativity and curiosity with the vast array of resources on the Internet, to create an original product to demonstrate their new knowledge” (Yoder, 2006: 24).

According to March (1998), WebQuests as inquiry-based activities have several merits such as developing thinking skills, cooperative learning, student motivation, and authenticity. These merits may help learners to improve their reading comprehension and vocabulary achievement. March (1998) maintains that when students are motivated they not only put in more effort, but also their minds are more alert and ready to make connections. He also believes that WebQuests use strategies to increase student motivation by giving students real resources to work with. He finally mentions that, “Rather than turn to a dated textbook, filtered encyclopedias or middle-of-the-road magazines, with the Web students can directly access individual experts, searchable databases, current reporting, and even fringe groups to gather their insights”.

Also, one of the main features of any WebQuest is that students tackle questions that prompt higher level thinking. March (1998) notes that in order to engage students in higher level cognition, WebQuests use scaffolding or prompting which has been shown to facilitate more advanced thinking.

March (1998) also maintains that constructivism suggests that when students need to understand a more complex or sophisticated topic like those that comprise WebQuests, it does not help to serve them simplified truths, boiled down examples, or step-by-step formulas. What they need are many examples with lots of information and opinions on the topic through which they will shift until they have constructed an understanding that not only connects to their own individual prior knowledge, but also builds new schema that will be refined when students encounter the topic again in the future.

Bearing this in mind, WebQuests are the beginning of student use of the Web for learning in general and reading comprehension and vocabulary achievement in particular. Therefore, the findings of this study will have implications for EFL teachers and learners. Through the findings of this study, EFL teachers will learn whether using webQuests is beneficial to the learners’ reading comprehension and vocabulary achievement or not. In case the results of the study support the use of WebQuests, teachers can plan for the appropriate use of WebQuests and provide learners with one source of authentic materials which may in turn prepare the learners for ‘real tasks’. However, in case the findings do not support the use of WebQuests, further research can guide teachers on using other means of computer-mediated communications and CALL tools.

1.4. Limitations and Delimitations of the Study

The limitations posed on the present study were as follows:

In order to effectively evaluate the effects of WebQuest on reading comprehension and vocabulary achievement of the participants it was necessary to have participants with the same computer literacy and the same internet connection speed. Because according to Codone (2001: 3), “user reaction and participation often depends on the
level of individual computer literacy”. Also “Internet bandwidth limitations and slow connection speeds sometimes hamper performance”.

However, due to the inconsistent internet speed in the context where the research study was carried out and due to the fact that the participants of the study had different social backgrounds and bearing in mind that the differing social background of the participants often influence their access to technological instruments, the researcher was not able to select participants with the same computer literacy and further instruction of the researcher during the treatment may have not compensated for this inconsistency which may have acted as an intervening variable.

The delimitation of this study includes:

The researcher focused only on intermediate-level students because according to proficiency level description, beginning English language learners have little or no ability to read and understand English used in academic and social contexts. While intermediate English language learners have the ability to read and understand simple, high-frequency English used in routine academic and social contexts. Therefore it is more appropriate for intermediate level to read a short story through WebQuest and follow its instructions. Moreover, advanced learners may have already developed reading comprehension strategies and thus may not be suitable for the purpose of this study.

Also the Extensive Reading which was used in the study was delimited to just a short story. According to Krashen (2000), the students who read literary texts and stories improve more in their vocabulary and reading comprehension. Since the focus of this study was on reading comprehension and vocabulary achievement of the participants, practicing of Extensive Reading was narrowed down to just short story to come to precise results based on the reading comprehension and vocabulary achievement of the participants.

2. Procedure

2.1. Pre-Treatment Stage

To conduct this study, two intact groups at Iranmehr language school were assigned to the researcher. The PET, consisting of three sub-parts; reading, listening, and writing, was used in order to make sure the two groups are homogenous. The test was piloted to a sample group consisting of 30 intermediate EFL learners whose proficiency level was similar to that of the participants of the study. Item analysis was carried out and the reliability coefficient was estimated using Cronbach Alpha.

Writing sub-parts of the students were scored by two raters; the researcher and one of her colleagues. The inter-rater reliability between the two sets of scores was computed. Then the piloted PET was given to 90 intermediate students. After analyzing the scores, 60 students whose scores were one standard deviation above and below the mean were selected and randomly divided into two groups, each containing 30 students.

In order to ensure the homogeneity of the two groups in terms of their proficiency, a t-test was run.

2.2. Treatment Stage
The participants attended an eight-week English course for three hours each week. Twenty minutes of every session was allocated to this study. It should be mentioned that the teacher of both groups was the researcher and both groups received the same instruction.

The reading comprehension activities that both groups did in the class included passage reviews, title predictions and alternative endings. In passage review students were asked to read a passage of their choice. After reading, they had to present a review of it to the entire class. Or they may read a passage in their course book and then paraphrase it or write a summary of it. In title predictions before reading out the passage, the teacher read out the title of the passage and encouraged the students to predict what was going to happen and what questions would be answered in the passage. The teacher recorded these on the blackboard and crossed them out when the predictions came true or the questions were answered.

At the end of the passage, the students could discuss as to why some of the predictions did not come true or why some questions were unanswered. Furthermore, the teacher asked the students to come up with alternate endings to the passage that they had read with reasons to justify the proposed ending. This would help the students focus on the story and also use their imaginations to come up with alternate endings.

And for vocabulary students usually made sentences with the new words. Paraphrasing, memorizing synonyms and antonyms, grouping and translation were some of the other vocabulary activities that students usually did in class. In grouping, students grouped words based on the topic, for examples, vocabularies related to crime and punishment. In translation, students read a story in a newspaper in Farsi first, and then read the same story in an English newspaper. The two papers were Hamshahri and Iran Daily. Most of the story would probably be the same, so the story in Farsi would help the students to prepare for the reading in English. For example, it would introduce the vocabulary to them, and when they read the English story and there was some vocabulary that they did not know, they could use their knowledge of the story to guess what the new vocabulary meant.

Therefore during these sessions, both groups received instruction; they read and analyzed the same stories, and they practiced the same activities. The only difference was that the experimental group was working on the WebQuest.

2.2. Instruction to the Experimental Group

The researcher created her WebQuest on ZUNAL Sites. ZUNAL, a web-based software, provides a free service for teachers and faculty to create WebQuests and share information online with others. ZUNAL created the structure of the researcher’s WebQuest which included all standard pages (Title Page, Introduction, Tasks, etc., as described in the Instrumentation section) and the researcher was able to edit each page according to the topic she chose.

The teacher introduced the ‘The Tell-Tale Heart’ short story WebQuest and wrote its address (http://zunal.com/webquest.php?w=135285) on the board and explained about its six basic sections that the students needed to use by clicking on the links on the left side of the page. Prior to each session, the students were supposed to read the story through the WebQuest at home and then come to the class and explain what they had done, tell about their feelings and the difficulties that they had encountered. Then they started to discuss about the short story worksheets they had downloaded from the
internet and had done at home and each session some of the students presented the review of the story in the class.

2.4. Instruction to the Control Group

The participants in the control group read the same story, the Tell-Tale Heart, from the book “24 Great Short Stories” at home and did the same worksheet as the experimental group. And like the students in the experimental group they were supposed to present the review of the story in the class. All the other activities in terms of proceeding through the reading passage and the introduction and practice of the vocabulary were exactly the same as the experimental group.

After the instruction and at the eighth week, both the experimental and the control group students received two posttests, a reading comprehension test and a vocabulary test to determine the effect of practicing Extensive Reading through WebQuest on reading comprehension and vocabulary achievement of the participants.

3. Statistical Analyses

At the onset of the study, the PET was piloted. The reading and listening subtests were scored; the item characteristics including item facility, item discrimination, and choice distribution were analyzed, and then their reliability was computed using Cronbach Alpha.

The writings of the students were scored by two raters, and the inter-rater reliability between the two sets of scores was computed through Pearson product-moment correlation coefficient after the assumption of normality was checked. The homogeneity of the participants in terms of their proficiency was further assured by running an independent samples t-test.

Then in order to test the research hypotheses, first the descriptive statistics of the reading comprehension and vocabulary posttest were computed and then after checking the assumptions, a MANOVA was run. The results indicated significant difference between the mean scores of the experimental and control groups on the reading comprehension posttest \( (F= 6.996, p= .01< .05, \text{ partial Eta squared}= .108, \text{ power}= .739) \), leading to the rejection of the first null hypothesis of the study. However, the vocabulary mean scores of the control and experimental groups did not demonstrate a significant difference \( (F= .043, p= .837> .05, \text{ partial Eta squared}= .001, \text{ power}= .055) \). Therefore, the researcher was not able to reject the second null hypothesis of the study.

Conclusively, the data suggested that practicing Extensive Reading through WebQuest had significant impact on intermediate EFL learners’ reading comprehension, but did not significantly impact their vocabulary achievement.

4. Conclusion

This study investigated whether there was any significant difference between the Extensive Reading through WebQuest and books in improving EFL learners’ reading and vocabulary achievement.

The results of the analysis of the data showed that Extensive Reading through WebQuest had significant impact on EFL learners’ reading comprehension. The
findings of this study are in line with those of other studies (e.g., Chun & Plass, 2000; Gruber-Miller & Benton, 2001; Kung & Chuo, 2002; Mosquera, 2001; Osuna & Meskill, 1998; Rico & Vinagre, 2000) which suggest that Web-based language learning (WBLL) has the potential to increase learner motivation and engage learners in culturally authentic and highly interactive language experience which in turn leads to better performance in the target language.

The findings of this study are also in line with those of Son’s (2007: 37), who maintain that through WebQuest learners decide on “the topics, reading materials, and the way they go about exploring the readings themselves. They decide on the process and the product, formulate the goals, identify Internet-based resources, and make a decision on how the outcomes should be evaluated”. Son (2007:37) further claims that, “In this way, the students take on the roles of self-directed and autonomous learners, and take full charge and responsibility for their outcomes”. Therefore, self-directed and more autonomous reading might have been the cause for the significant impact of WebQuest on the reading of the participants of this study.

Moreover, it may have been the case that Extensive Reading through WebQuest entailed more exposure to various reading materials as compared with Extensive Reading through books because learners may have encountered various materials while searching for the ones they intended to read. Thus, through WebQuest more input might have been provided for the learners.

As another justification for the significant finding of this study, one can refer to the fact that WebQuest allows students to explore selected areas in more depth (Jimenez & Lasso, 2008) and thus, more reflective and more critical reading may have resulted.

Another justification for the significant effect of WebQuest on reading could be due to the audiovisual feature available in WebQuest which is often not as much available in printed books. According to Echevarria, Vogt, and Short (as cited in Sox & Rubinstein-Avila, 2009: 41), “The use of illustrations, graphic organizers, trade books, and audiovisual resources provide scaffolding, making the content information more easily accessible for ELLs”. Sox and Rubinstein (2009: 43) assert that in WebQuests “photographs and clip art can be used to build the background knowledge of ELLs”.

However, the data analysis of the study showed that Extensive Reading through WebQuest had no significant impact on EFL learners’ vocabulary achievement. The reason that WebQuest did not have any significant impact on learners’ vocabulary achievement could have been due to the fact that in both control and experimental groups the learners were exposed to vocabulary through Extensive Reading and thus may have followed the same procedure of guessing the meaning from the context or looking up the new words in the dictionary.

In other words, through WebQuest, like any other Extensive Reading, language learners learned to get the message of the text and comprehend the meaning of the whole passage rather than focusing on single words. This indicates a more holistic approach toward comprehension rather than a micro focus on the form of the language, like vocabulary and grammar, while reading.

Moreover, in a study by Sox and Rubinstein-Avila (2009), in which they investigated the standard quality of eight WebQuests for secondary students for whom English was an additional language, they designed a rubric to assess the appropriacy of WebQuests in terms of three main features: linguistic, multimedia, and organizational. They found out that there were serious concerns for these three features of Webquests and their appropriacy for meeting the needs of ELLs. Therefore, they made certain suggestions such as: providing first language support such as bilingual dictionaries, carefully placing visuals to enhance comprehension of the instructions and key vocabularies,
highlighting content vocabulary and essential words, and providing graphic organizers for note-taking and planning the final product in order to improve comprehension of ELLs.

Therefore, the reason WebQuest did not result in significant vocabulary achievement of the participants of this study may have been due to the specific features of the WebQuest used in this study. The WebQuests used in this study had audiovisual features that were related to the general idea or the topic of the reading but not to the new vocabularies; the new vocabularies were highlighted in all WebQuests, but only in some of them the meaning would be shown with a click of the mouse; the dictionaries available were monolingual and not bilingual; and finally no graphic organizers were available. Therefore, the findings of this study in terms of its impact on vocabulary achievement must be generalized with caution.

Therefore, it could be concluded that the use of WebQuests can have significant impact on EFL learners’ reading comprehension, but for an equivalent impact in terms of vocabulary achievement, certain features of the WebQuest have to be taken into consideration and need to be assessed for determining its effectiveness and appropriacy.

5. Pedagogical Implications

The findings regarding the significant effect of the treatment on reading comprehension support the finding of other study. Tsai (2006) identified a connection between WebQuests and the ability of students to identify contextual clues and main ideas in readings within the context of English as a Foreign Language.

Also the researcher directly observed more enjoyment and higher degree of motivation among the learners who read the story through WebQuest. Therefore, practical implications can be considered for the findings of this study. The main implication of this study would be directed to language teachers, students, teacher educators, syllabus designers, and curriculum developers to consider WebQuest as one of the effective strategies in EFL environment, particularly in relation to reading comprehension.

5.1. Implications for EFL Teachers

Most English language learners often say that reading, which is a vital element of language learning, is boring and difficult. Wigfield (1997) noted that intrinsic reading motivation, consisting of curiosity in learning about a particular topic of interest, the pleasure gained from being engaged in reading interesting materials and the challenge in learning complex or difficult ideas are important components in turning students into proficient readers. Thus, the finding of this study could be of immediate interest to language teachers to make reading more enjoyable and engage learners in the process of reading more effectively through WebQuest.

The use of technology in teaching and learning can help bring reading alive for learners. Web-based inquiry learning environment (WebQuest) can facilitate the reading experience and help students meet challenging standards while addressing essential questions that bring meaning to learning. Through the use of WebQuests, students engage in problem solving, information processing, and collaboration.

Undoubtedly, the strategies that teachers employ have important roles in their learners’ achievement, thus their efforts to explore different sources for teaching are of
great significance. It can be concluded from this study is that practicing Extensive Reading through WebQuest increases student reading comprehension. As a result, it may be insightful for EFL teachers to embrace WebQuest for reading short stories in order to supplement the reading comprehension of learners.

WebQuest design and implementation workshops should be attended by teachers in order to be able to properly incorporate WebQuest into their instruction. There are several websites that are specifically geared towards creating webquests. Questgarden, Zunal, and Teacherweb all allow teachers to create accounts and walk them through the process of creating a WebQuest. In addition to the WebQuest design training, WebQuest facilitation training should be presented to teachers.

In EFL instruction, teachers should understand learner difficulties, such as L2 reading issues and non-linear reading problems. Therefore, the researcher highly recommends the teachers to integrate WebQuests into their teaching as it seems they are “excellent instructional tools for promoting critical thinking skills, scaffolding, and cooperative learning” (Zheng, Stucky, McAlack, Menchanna & Stoddart 2005).

5.2. Implications for EFL Learners

Another group who can benefit from the findings of this study is EFL learners. One of the strong points of WebQuest instruction as the researcher directly observed is that WebQuest increases student motivation. When students are motivated, they are likely to put in more effort, and their minds are more alert and ready to make connections. Several aspects of WebQuests contribute to increasing student motivation. Many WebQuest tasks are designed to address problems or issues that exist in the real world which make the task authentic. In WebQuests, students use real and timely resources such as websites and online resources.

The WebQuest itself provides structure to the investigation of the authentic topic, thereby increasing the ability of students to successfully navigate a highly unstructured environment such as the Internet. Also, WebQuests prompt higher-level thinking. The questions posed to students require more than just finding and spitting back information. They must take the information they research and transform it into something else. Students then develop a product which then demonstrates their knowledge of the problem and its potential solutions.

Therefore, WebQuest is also oriented toward task-based language teaching in which the outcome of the task is the main objective to achieve and is thus, a technological tool which is very much in line with the developments in English language learning and teaching.

5.3. Implications for Teacher Educators

Webquests are learner motivational web-based teaching methodologies that are advantageous for both EFL teachers and learners, so it would be beneficial to incorporate WebQuest into EFL teaching and learning programs.

In doing so, the teachers educators can play important roles. WebQuests are an implementation of technology that teachers consider as an up-to-date strategy that provides knowledge for students in an interesting manner (Vidoni & Maddux, 2002). Therefore, integrating new strategies into teaching methods, such as WebQuest with
specific feature can be emphasized by teacher educators in teacher training courses for novice teachers as well as during workshops for in-service-teachers. Besides informing teachers about the significance of WebQuest, they can provide teachers with clear and comprehensive procedures of creating WebQuest, so that there would be a kind of unity among teachers’ methodology in each language school.

5.4. Implications for Curriculum Developers and Syllabus Designers

Since the beneficial effects of WebQuest in reading comprehension have been reassured by the present study, the curriculum developers and syllabus designers can incorporate WebQuest strategy to the existing curriculum and develop a collection of appropriate WebQuest for curricular use. Integrating WebQuest into the curriculum involves infusing the necessary components to extend and enrich the existing course curriculum.

6. Suggestions for Further Research

This study attempted to investigate the effect of practicing Extensive Reading through Web-Based Inquiry learning Environment (WebQuest) on Intermediate EFL Learners’ reading comprehension and vocabulary achievement. Several possible directions have emerged from this study with the hope that they inspire other researchers who decide to conduct studies in this area in future:

1. The results of this study suggest that WebQuest is a favorable tool for reading comprehension. Therefore, the researcher suggests further investigation into the effect of WebQuests on EFL learners’ critical reading.

2. However, as the results of this study did not turn out to be significant for vocabulary achievement, the researcher recommends additional research into the effectiveness of WebQuests in relation to vocabulary achievement. This implies investigating and identifying WebQuest features that could signify effectiveness in relation to vocabulary achievement.

3. Furthermore, research on the actual educational benefits of WebQuests is lacking. Although there seems to be an abundance of descriptive writing related to WebQuests, the literature is quite sparse when searching for research findings. Empirical studies are needed to further explore the role that WebQuests can play in EFL instruction, particularly the main four language skills.

4. In addition, the effect of WebQuest should be evaluated using other disciplines and age groups and in a variety of learning environments to determine its effects on student’s learning.

5. There is enough support to encourage further studies on the use of WebQuests in teacher preparation programs.

6. This study was quantitative, but the researcher suggests a more in-depth analysis of students’ and teachers’ attitudes toward WebQuest and their perceptions of its efficacy. Research should include exploration of the roles teachers and learners play in an advantageous use of WebQuests and how they interact through this technology by using both observation data and attitudinal survey methods. Also, a qualitative research with observations is needed to further investigate the students’ learning process during a
WebQuest instruction and determine language learners’ concerns and problems both in terms of language learning and technological difficulties.

7. Most of today’s students are not sufficiently exposed to resourced-based learning, and thus, may not be prepared to understand this type of learning (MacGregor & Lou, 2004). Further research is necessary to explore what types of scaffolds are beneficial for learners completing a WebQuest. Also, an interactive feedback facility embedded in a WebQuest instruction could be used to determine if there is a correlation between the frequency of using the feedback mechanism and the students’ achievement.

6. References


The Dynamic Nature of Autonomy in Foreign Language Learning

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Abstract. The study reported in this paper examined the changing character of autonomy in foreign language grammar learning by tracing its fluctuations over the period of several weeks and during the course of several classes. The study also investigated the impact of the use of online resources and a browser-based virtual world on the development of autonomy in comparison with instruction based on conventional materials. 27 senior high school students participated in the research project. They were divided into two groups: the experimental group (n=13) and the control group (n=14). The data were collected by means of grammar autonomy questionnaire administered before and after the treatment as well as autonomy self-evaluation sheet completed by the subjects after several lessons. The data were subjected to quantitative analysis. The results show that the study participants’ levels of autonomy were indeed subject to change. Furthermore, the results demonstrate that the experimental learners manifested greater independence in learning immediately after the intervention and one month later, while at the same time the control students reported lower levels of autonomy.

Keywords. autonomy in foreign language learning, autonomous changes, learning grammar, Internet resources, browser-based virtual worlds

1. Introduction

According to Benson (2001: 183), almost all research in the field of autonomy is based on and has implications for the following three hypotheses: (1) the concept of autonomy is based on a natural tendency for learners to take control over their learning, i.e. autonomy is available to all students, even though it is displayed in different ways and to different degrees in relation to the typical features of both each student and learning situation, (2) students who lack autonomy are able to develop it provided they are given appropriate conditions (i.e. opportunity to exercise control over learning) and preparation, and (3) autonomous learning is more effective than non-autonomous learning i.e. the development of autonomy implies better language learning. Numerous empirical investigations of autonomy in language learning have been conducted in many parts of the world in recent years. They aimed to diagnose the level of autonomy in various educational settings (e.g. Pawlak 2008a; Strzalka & Żdziebło 2008; Siek-Piskozub & Strugielska 2008), attempted to compare the relationship between the development of learner autonomy and language achievement (e.g. Dam & Legenhausen 1996; Dafei 2007; Mystkowska-Wiertelak 2008; Kruk 2012a), investigated the way leaner autonomy might be developed (e.g. Sert 2006; Balçikanli 2008; Pawlak 2008b; Andrzejewska 2011) or explored the use of computer technology in the development of learner autonomy (e.g. Kruk 2011; Skweres 2011; Kruk 2012b; Wach 2012). It is unfortunate, however, that most of the research projects have failed to take into consideration the dynamic character of autonomy in language learning, as reflected in its variation over extended periods of time as well as over sequences of lessons. The present paper is an attempt to partly rectify this problem by reporting the findings of a study whose purpose was to investigate changes in autonomous behavior of Polish senior high schools students over time. Furthermore, the study sought to investigate the impact of using a combination of Internet resources with a browser-based virtual world on the development of autonomy in comparison with traditional instruction based on conventional materials.
2. Models of learner autonomy

The literature offers several models of learner autonomy in language learning in which researchers present it as a succession from lower to higher level. In one such model, Littlewood (1996: 430-431) describes three components and domains of autonomy, such as autonomy as communicators, autonomy as learners and autonomy as persons and suggests that there are different levels of autonomy in each domain. Thus, according to the researcher, autonomy as a communicator depends on the ability to use the target language creatively as well as the ability to use appropriate strategies for communicating meanings in specific situations. As for autonomy as a learner, it includes the ability to engage in independent work (e.g. self-directed learning) and the ability to use appropriate learning strategies both inside and outside the classroom. When it comes to autonomy as a person in the foreign language learning context, it depends on the ability to express personal meanings and the ability to create personal learning contexts, for example, through interacting outside the classroom.

In another attempt to model levels of learner autonomy Littlewood (1997: 81) distinguishes language acquisition, learning approach and personal development. As regards language acquisition, autonomy in this model entails “an ability to operate independently with the language and use it to communicate personal meanings in real, unpredictable situations.” In the next stage, autonomy is viewed as “an ability to take responsibility for their own (students’) learning and to apply active, personally relevant strategies.” As far as the last context is concerned, autonomy is related to personal development in which it comprises a goal of “greater generalized autonomy as individuals.” It should be noted that in this model of autonomy the dimensions of language acquisition, learning approach and personal development correspond to the domains of autonomy as a communicator, a learner and a person presented in the model described above.

Nunan (1997: 195), in turn, sets out a scheme in which he proposes five levels for encouraging learner autonomy. In this model of learner autonomy, the levels of student action involve such issues as awareness, involvement, intervention, creation and transcendence, each of which entails measurements of content and process. In terms of content, the first step along the autonomy continuum is to make students aware of the purpose and content of the curriculum or pedagogical materials. The second step is to engage learners in choosing goals and content from a variety of alternatives presented to them. Further along the path towards autonomy, learners may modify and adapt goals and content. The next level is to involve students in creating their own goals and content so as to function as fully autonomous learners at the final level. In the terms of process, learners identify their own preferred learning styles or strategies (level 1) and make choices among a variety of options (level 2). Next, students modify or adapt tasks (level 3) in order to create their own ones (level 4). Finally, learners become teachers and researchers (level 5).

Yet another interpretation of levels of learner autonomy is presented by Littlewood (1999: 75) who promotes the concept of two types of autonomy, that is, proactive and reactive. As far as proactive autonomy is concerned, it describes learners who are in charge of their own learning, select learning methods and techniques, set their learning goals and eventually self-assess their language performance. When it comes to reactive autonomy, Littlewood states that it “is the kind of autonomy which does not create its own direction but, once a direction has been initiated, enables learners to organize their resources autonomously in order to reach their goal” (1999: 75). In this case, students work on their own, organize groups and collaborate. Moreover, Littlewood argues that, although for a number of researchers it is proactive autonomy that matters in language education, reactive autonomy can be viewed as a goal in its own and probably a possible transition to proactive autonomy.
Sharle and Szabó (2000: 1) offer a model of learner autonomy that consists of several levels of autonomy development. The researchers categorize various activities aimed at developing learner autonomy into three sections representing three phases of the developmental process that involved raising awareness, changing attitudes and transferring roles. When it comes to the first phase, it is devoted to assisting students in “becom[ing] aware of the differences their contributions can make, and of the nature of language learning in general” (2000: 1). As regards the second and third phases, students will “need some well-structured practice in their new attitudes as responsible learners” (phase two) in order to “be ready to take over some roles from the teacher and enjoy the freedom that comes with increased responsibility” (phase three). It could be argued that such an approach to the development of autonomy allow teachers to develop autonomy gradually and within regular school hours.

Benson’s model (2001) of learner autonomy entails dimensions of control over language learning and teaching processes that can be designated as control over learning management, control over cognitive processes and control over learning content (2001: 76-103). According to the researcher, the first dimension, i.e. the control over learning management, can be best explained with respect to “the behaviours that learners employ in order to manage the planning, organisation and evaluation of their learning” (2001: 76). More precisely, learners are assisted in discovering and evaluating strategies that they use in a learning task as well as being encouraged to explore strategies that they have never tried out before. As for the second dimension, i.e. the control over cognitive processes, Benson claims that it can be “understood as a matter of the psychology of learning rather than as directly observable learning behaviours, although it will generally be inferred from the observation of these behaviours. It is also less concerned with general attitudes towards learning than with particular mental processes associated with the idea of control” (2001: 87). Moreover, the researcher makes an attempt to describe the control over the cognitive processes engaged in language learning with regard to attention, reflection and metacognitive knowledge. When it comes to the last dimension, i.e. the control over learning content, it is part of self-management which, like other aspects of learning management, is based on the control over cognitive processes. According to Benson, control over content is crucial to autonomy, since “if learners are self-managing methodological aspects of the learning process, but not learning what they want to learn, their learning may not be authentically self-directed” (2001: 99). Furthermore, in institutional contexts, learner control over content has social and political aspects, which means, that students “may have to learn how to exercise control over the collective situation of their learning, using capacities for social interaction that are distinct from those required in the management of individual learning” (2001: 99).

Last but not least, Tassinari (2012: 28) presents a dynamic model of learner autonomy in which learner autonomy is viewed as a complex construct or a construct of constructs encompassing various components such as cognitive, metacognitive, affective, motivational, action-oriented and social. The model encapsulates these components with regards to learners’ competencies, skills, choices and decision-making processes as well as determines their reciprocal relationships. The components of this dynamic model of learner autonomy are domains of competencies, skills and actions with no hierarchy among them. According to Tassinari, the model is both structurally and functionally dynamic, i.e. “it is structurally dynamic, because each component is directly related to all the others […] it is functionally dynamic, because learners can decide to enter the model from any component and move freely from one component to another without following a given path, according to their needs and purposes” (2012: 29).

As can be seen from the above, several competing models of learner autonomy have been proposed which present a trend in the literature on the development of autonomy as a gradual and
dynamic process. These different models of learner autonomy show that the concept of autonomy is a very complex one, which makes it difficult to introduce it into language instruction straight away. Moreover, it has to be remembered that language learners display various levels of autonomous behaviors, including those making up the same class, and that the effort of promoting autonomy simply takes time. Finally, in some educational contexts, such as the Polish one, in which foreign language instruction is frequently limited to two or three classes per week as well as students’ diversity in terms of language proficiency within a single class, such models of learner autonomy present at least an opportunity to promote autonomy, beginning with elementary schools and continuing up into university or college levels.

3. The study

3.1. Aims of the study

The study aimed at investigating the changing nature of autonomy in foreign language grammar learning by tracing its changes over the period of several weeks and its variations from one lesson to another. Another purpose of the study was to examine the impact of using a combination of online resources with a browser-based virtual world on the development of autonomy in learning the past simple tense in comparison with instruction based on conventional materials.

3.2. Participants

The subjects were 27 third grade students of Polish senior high school. They were randomly divided into two groups in accordance with the policy of the school which divides a class of more than 25 students into groups for foreign language lessons. Thus, the experimental group (ExG) consisted of 13 subjects and the control group (CG) comprised 14 learners. The students in each group had three hours of English a week and they were taught by two English teachers – the present author and his colleague. The analysis of the responses to the background questionnaire revealed that, on average, the experimental students had been learning English for 8.46 years and the learners in the control group for 8.50 years. When it comes to the subjects’ self-assessment, it turned out to be slightly higher in ExG than in CG and amounted to 2.77 and 2.50, respectively. All subjects stated that learning new vocabulary and reading were the most favorite things to learn, while grammar was considered to be the most difficult subsystem for them to study. Only one member of the experimental group and one student in the control group admitted to attending private tutorials either at the time of or before the study. A similar number of the students in each group admitted to receiving any type of outside exposure, but it was rather insignificant as the majority of them only listened to English music, occasionally watched movies with the Polish subtitles and read some Internet sites. These facts were welcomed by the present author as this meant that the likelihood of out-of-class exposure unduly affecting the outcomes of the study were minimal.

3.3. Treatment

The first lesson in the experimental group began with the students searching the Internet, using web pages to find information related to the past simple tense and taking notes on the use of the
past simple tense. The second half of the class was devoted to online grammar practice. The learners were provided with links to several websites containing a variety of exercises on the item in question (e.g. http://www.ego4u.com/en/cram-up/grammar/simple-past#exercises or http://perso.wanadoo.es/autoenglish/gr.pastsim.i.htm) and asked to perform several activities of their own choice. The activities were of the following types: writing sentences with the use of given words, answering questions, rewriting sentences, filling the gaps, matching and asking about the underlined part of the sentence. When it comes to the second lesson, it started with further grammar practice by means of the above-mentioned websites and activities. After approximately twenty minutes, the experimental subjects were requested to log on to the browser-based virtual world Yoowalk (http://www.yoowalk.com/) in order to talk with its virtual residents using the grammar structure. As for the last lesson, it was in its entirety conducted in the virtual world. This time however, the learners pretended to be journalists working for a local newspaper. Their task was to collect information and write a short note concerning the residents of Yoowalk past activities.

When it comes to the control group, the first lesson started with the teacher’s presentation related to the past simple tense. The remaining part of this class was devoted to doing a series of exercises from the coursebook of the following kind: completing sentences with the verbs in the correct form and rewriting sentences. The second lesson began with a simple gap filling exercise. During the next activity, the teacher asked each student questions which required them to provide short answers. This activity was followed by a similar task; however, this time the answers to the teachers’ questions were to be answered in full sentences. The lesson finished with the students asking and answering various types of questions. It has to be added that all activities were controlled by the teacher who always corrected the students’ mistakes and provided feedback. As regards the third lesson, it commenced with a short exercise in which the students were requested to write sentences from words in brackets. The activity was again checked by the teacher who nominated several students to read and then write the correct sentences on the board. During the third lesson the students in the control group performed an activity similar to that in the experimental group. Here however, the learners were asked to work in pairs, impersonate journalists of a local newspaper and interview citizens of an imagined local town in order to obtain information needed to write a short note on their interlocutors’ past activities.

3.4. Data collection tools, procedures and analysis

The data were collected by means of a background questionnaire, grammar autonomy questionnaire (GAQ) and autonomy self-evaluation sheet (ASES). Prior to the study, these instruments were piloted with a comparable group of senior high school students and some modifications were introduced. It should also be noted that the tools were designed and presented to the students in Polish so as to avoid any potential misunderstandings. All the questionnaires were filled in by the study participants before and after the treatment. The research schedule is given in Table 1.

<table>
<thead>
<tr>
<th>Time</th>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>Background questionnaire, grammar autonomy questionnnaire (GAQ1)</td>
</tr>
<tr>
<td>Lesson 1</td>
<td>Autonomy self-evaluation sheet (ASES1)</td>
</tr>
</tbody>
</table>
Lesson 2: Autonomy self-evaluation sheet (ASES2)
Lesson 3: Autonomy self-evaluation sheet (ASES3)
Week 3: Grammar autonomy questionnaire (GAQ2)
Week 7: Grammar autonomy questionnaire (GAQ3)

The background questionnaire aimed at providing such information as the learners’ personal history of foreign language learning, the amount of out-of-school exposure, attitudes or motivation. The data obtained by means of the background questionnaire involved quantitative and qualitative analysis and sometimes both ways of analyzing the data were utilized. As regards GAQ, it was created by focusing on the aspects mentioned in similar questionnaires available in the literature (e.g. Pawlak 2008b, Czura 2010, Kruk 2010). Its purpose was to measure the students’ autonomy in learning English grammar before and after intervention. The tool contained 28 items and was designed in the form of Likert-scale statements ranging from 1 (‘the statement does not describe me at all’) to 5 (‘the statement describes me very well’). In addition, GAQ comprised seven categories which included: (1) the ability to select and implement relevant resources, (2) collaboration with other students, (3) the ability to establish learning aims and objectives, (4) engagement in outside classroom learning, (5) the ability to evaluate own grammar, (6) the capability to implement appropriate strategies in learning grammar and (7) the role of the teacher and the role of the learner in grammar instruction and learning. The reliability estimate for the questionnaire was established on the basis of the results obtained before, immediately after the treatment and after four weeks by means of Cronbach alpha. The tool has been shown to be both reliable and valid each time it was administered, with the lowest alpha coefficient of .78 and the highest of .91 (the average amounted to .87). 1As far as ASES is concerned, the questionnaire contained 6 Likert-scale items (e.g. “During the lesson I did exercises which were appropriate to my level of grammar proficiency”, “I was able to evaluate myself” or “After today’s lesson I know what I should work on more”) where 1 indicated disagreement and 5 agreement. Also in this case, the reliability of the instrument was acceptable as the average of Cronbach’s alpha amounted to 0.72.

It should be noted that the statistical analyses also involved tabulating the means and standard deviations for all data collection tools (McKay, 2006: 44). The levels of statistical significance were established by means of the paired-samples t-tests and independent-samples t-tests. The first test was employed to assess the changes within one group and the second was used when the experimental and control groups were compared. The tests were conducted by means of the Statistical Package for the Social Sciences (SPSS version 19 for Windows). The significance value was set at \( p \leq 0.05 \) for all analyses.

4. Results

Table 2 shows the means, standard deviations and statistical analysis of grammar autonomy questionnaires for the experimental group and control group. The means the groups achieved on these questionnaires are also plotted in Figure 1 for easier comparisons. Since there were some intergroup differences between GAQ1 means, independent samples 2-tailed t-test was run; however no significant difference was found (\( p > 0.05 \)). This result meant that any observed changes in autonomous behavior were due to treatment and not due to initial differences between

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1The interpretations of the values of Cronbach alpha are based on Larson-Hall (2010: 171).
the two groups. Furthermore, the data revealed that ExG displayed higher levels of autonomy on GAQ2 when compared with CG (the difference of 0.44 of a point) and the difference turned out to be of statistical significance. As for GAQ3, the data showed that both groups manifested less autonomy in comparison with GAQ2, with the difference between the groups amounting to 0.40. Also this time, this difference reached statistical significance (see Table 2).

Table 2. Means, standard deviations and statistical analysis of GAQs for the experimental and control groups.

<table>
<thead>
<tr>
<th></th>
<th>ExG</th>
<th>CG</th>
<th>Statistical analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M (SD)</td>
<td>M (SD)</td>
<td>(2-tailed t-tests)</td>
</tr>
<tr>
<td>GAQ1</td>
<td>3.24 (1.06)</td>
<td>3.11 (1.11)</td>
<td>t(54)=0.912, p=.366</td>
</tr>
<tr>
<td>GAQ2</td>
<td>3.51 (0.85)</td>
<td>3.07 (1.09)</td>
<td>t(54)=3.299, p=.002*</td>
</tr>
<tr>
<td>GAQ3</td>
<td>3.41 (0.79)</td>
<td>3.01 (1.06)</td>
<td>t(54)=3.199, p=.002*</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Statistical analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(two-tailed paired t-test)</td>
</tr>
<tr>
<td>GAQ1→GAQ2: t(27)=-4.783, p=.000*</td>
<td>GAQ1→GAQ2: t(27)=.503, p=.619</td>
</tr>
<tr>
<td>GAQ2→GAQ3: t(27)=2.292, p=.030*</td>
<td>GAQ2→GAQ3: t(27)=1.433, p=.163</td>
</tr>
<tr>
<td>GAQ1→GAQ3: t(27)=-2.942, p=.007*</td>
<td>GAQ1→GAQ3: t(27)=1.174, p=.251</td>
</tr>
</tbody>
</table>

When it comes to the experimental group, their autonomy increased from GAQ1 to GAQ2 by 0.27 of a point, while at the same time the degree of autonomy in the control group dropped by 0.04. However, the results of GAQ3 revealed that then the level of autonomy in ExG and CG decreased by 0.10 and 0.06, respectively. In the long run, between the first and the last administration of GAQ, ExG reported more autonomy (the difference of 0.17), while the subjects in the control group became even less autonomous than before the study (the difference of 0.10). It has to be added that all the differences in the means of the experimental group reached statistical significance (see Table 2).

We can, therefore, conclude that the treatment with the application of online resources and the browser-based virtual world resulted in statistically significant growth in the level of autonomy in...
ExG after the treatment. What is also clear from the above is that the decrease in autonomy for ExG did not hold over the time frame of the present study, as revealed by the significant differences between GAQ2 and GAQ3 in that group. It should also be added that there were no statistically significant differences over time in the levels of autonomy in the control group, and that the control students continued to become less autonomous. It may be therefore concluded that the traditional type of treatment did not have a positive effect on fostering autonomy among students in the control group.

The results of GAQ with respect to categories are presented in Table 3. These data show that the members of ExG manifested more autonomous behavior in all categories from GAQ1 to GAQ2 and from GAQ1 to GAQ3 except category 2. A much more complicated picture emerges in the case of CG since the subjects’ declared level of autonomy increased from GAQ1 to GAQ2 in three categories (i.e. 3, 4 and 6) and at the same time it decreased in four ones (i.e. 1, 2, 5 and 7). When it comes to the changes in the control learners’ autonomy from GAQ2 to GAQ3 and GAQ1 to GAQ3, it rose in two areas (i.e. 2 and 3) and dropped in five (i.e. 1, 4, 5, 6 and 7). It has to be noted, however, that the changes in the degree of autonomy were minute and only some of the within-group differences turned out to be statistically significant or near-significant, as shown in the bottom rows of Table 3. In particular, the experimental subjects reported significantly better engagement in outside classroom learning (category 4) from GAQ1 to GAQ2 (the difference of 0.19) and also declared significantly greater role of the learner in grammar learning (category 7) from GAQ1 to GAQ2 (the difference of 0.32). What is more, category 3 (i.e. the ability to establish learning aims and objectives) approached statistical significance, with the difference of 0.32 of a point. When it comes to the control group, no statistically significant differences were found and only one category (i.e. 6) from GAQ2 to GAQ3 turned out to be of near-significance. However, the subjects in that group declared to be less able to implement appropriate grammar strategies (the difference of 0.16).

**Table 3. Means, standard deviations and statistical analysis of GAQ categories for the experimental and control groups.**

<table>
<thead>
<tr>
<th>Category</th>
<th>ExG M (SD)</th>
<th>CG M (SD)</th>
<th>Statistical analysis (2-tailed t-tests)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GAQ1</td>
<td>3.33 (1.08)</td>
<td>2.96 (1.16)</td>
<td>t(6)=0.874, p=.416</td>
</tr>
<tr>
<td>GAQ2</td>
<td>3.44 (0.82)</td>
<td>2.93 (1.05)</td>
<td>t(6)=1.725, p=.135</td>
</tr>
<tr>
<td>GAQ3</td>
<td>3.38 (0.84)</td>
<td>2.87 (1.10)</td>
<td>t(6)=5.893, p=.132</td>
</tr>
<tr>
<td>GAQ1</td>
<td>3.12 (1.10)</td>
<td>3.13 (1.24)</td>
<td>t(6)=0.026, p=.980</td>
</tr>
<tr>
<td>GAQ2</td>
<td>3.35 (0.93)</td>
<td>3.07 (1.02)</td>
<td>t(6)=0.631, p=.551</td>
</tr>
<tr>
<td>GAQ3</td>
<td>3.37 (0.92)</td>
<td>3.20 (1.09)</td>
<td>t(6)=0.401, p=.702</td>
</tr>
<tr>
<td>GAQ1</td>
<td>2.83 (1.05)</td>
<td>2.68 (1.07)</td>
<td>t(6)=0.625, p=.555</td>
</tr>
<tr>
<td>GAQ2</td>
<td>3.15 (0.97)</td>
<td>2.80 (1.11)</td>
<td>t(6)=1.203, p=.274</td>
</tr>
<tr>
<td>GAQ3</td>
<td>2.90 (0.69)</td>
<td>2.93 (0.97)</td>
<td>t(6)=0.080, p=.939</td>
</tr>
<tr>
<td>GAQ1</td>
<td>3.00 (1.19)</td>
<td>2.95 (1.12)</td>
<td>t(6)=0.094, p=.928</td>
</tr>
<tr>
<td>GAQ2</td>
<td>3.19 (0.83)</td>
<td>3.04 (1.09)</td>
<td>t(6)=0.303, p=.772</td>
</tr>
<tr>
<td>GAQ3</td>
<td>3.15 (0.73)</td>
<td>2.80 (1.08)</td>
<td>t(6)=0.765, p=.473</td>
</tr>
<tr>
<td>GAQ1</td>
<td>3.63 (0.99)</td>
<td>3.59 (0.92)</td>
<td>t(6)=0.222, p=.832</td>
</tr>
</tbody>
</table>
To further explore the effects of the two kinds of treatment on the subjects’ level of autonomy, a series of independent samples 2-tailed t-tests were run on the results and some of the inter-group differences proved to be statistically significant as shown in the right hand column of Table 3. In particular, the responses for category 5 indicate that the members of ExG were able to evaluate their own grammar significantly better than their control counterparts on GAQ 2 and GAQ3, with the difference of 0.55 and 0.71, respectively. A statistically significant difference existed also between the two groups in the subjects’ perception of the role of the teacher and the role of the learner in grammar instruction and learning (category 7) on GAQ 2 and GAQ3, with the difference of 1.15 and 1.13, respectively.

Table 4 and Figure 2 show the participants of the study level of autonomy after each of the three lessons measured by ASES. These data show that the experimental students declared a steady and quite high level of autonomy over the course of the three classes, while the changes in the control group were somewhat more dynamic. Here the reported autonomy in CG first dropped by 0.12 from lesson 1 to lesson 2 and then increased quite dramatically by 0.46 from class 2 to class 3. When such fluctuations are juxtaposed with the lessons plans, it turns out that during the first two classes the control students worked under strict supervision of the teacher. It could be argued that the increase observed after the third lesson might have been the result of a pair-work activity and a writing exercise in which the students were allowed more freedom in learning.
the target language. It is also interesting to note that the changes in the levels of autonomy declared by the students in the control group reached statistical significance from ASES2 to ASES3 and from ASES1 to ASES3 (see Table 4). When it comes to the differences between ExG and CG, the two groups differed significantly on ASES1 and ASES2, with the difference of 0.77 and 0.86, respectively.

Figure 2. Means for the experimental and control groups on ASES.

Table 4. Means, standard deviations and statistical analysis of ASES for the experimental and control groups.

<table>
<thead>
<tr>
<th></th>
<th>ExG</th>
<th>CG</th>
<th>Statistical analysis (2-tailed t-tests)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASES1</td>
<td>4.24 (0.55)</td>
<td>3.47 (0.24)</td>
<td>t(10)=3.137, p=.011*</td>
</tr>
<tr>
<td>ASES2</td>
<td>4.21 (0.38)</td>
<td>3.35 (0.52)</td>
<td>t(10)=3.230, p=.009*</td>
</tr>
<tr>
<td>ASES3</td>
<td>4.24 (0.37)</td>
<td>3.81 (0.32)</td>
<td>t(10)=2.121, p=.060</td>
</tr>
</tbody>
</table>

Statistical analysis (two-tailed paired t-test)

- ASES1→ASES2: t(5)=0.444, p=.675
- ASES2→ASES3: t(5)=0.908, p=.405
- ASES1→ASES3: t(5)=4.812, p=.005*

It should also be pointed out that by and large the values of the standard deviation decreased from GAQ1 to GAQ3 in the experimental group when it comes to the overall results of the grammar autonomy questionnaire and its categories as well as ASES (see Tables 2, 3 and 4). However, the control group’s standard deviations were more susceptible to change and generally higher than those in the experimental group. This means that the treatment employed in the experimental group leveled out the differences between the subjects’ autonomy, while the traditional treatment increased them and made the control learners more diverse.
5. Discussion

The results of the study demonstrate that the levels of autonomy changed over time in both the experimental group and the control one. It should be noted, however, that such fluctuations were more pronounced in the case of the experimental learners when it comes to the overall results of the grammar autonomy questionnaire. On the other hand, the overall degree of autonomy in the control group remained approximately on the same level throughout the study, although it kept decreasing from GAQ1 to GAQ3. By contrast, the results of the autonomy self-evaluation sheet showed that the level of autonomy remained almost the same at different points in time in the experimental group. At the same time, the control subjects manifested various levels of autonomy from lesson to lesson. It is also interesting to note that the changing character of autonomy was found in various categories related to GAQ. Here, again, the most visible fluctuations in autonomous behavior were observed among the members of the control group. Such findings provide evidence that fostering learner autonomy leads to changes in autonomous behavior over longer periods of time and is less amenable to modifications over shorter periods (i.e. from class to class). On the contrary, traditional or teacher centered instruction, results in greater fluctuations in the level of autonomy in the course of single lessons and does not change substantially over longer periods of time, ultimately preventing language learners from becoming autonomous.

The analysis of the data obtained by means of GAQ demonstrated that the experimental group became more autonomous after the treatment when compared with the control group, whose level of autonomy kept decreasing from GAQ1 to GAQ3. What is more, the differences between the two groups reached statistical significance on GAQ2 and GAQ3. The favorable effects of instruction based on online resources and the virtual world are also visible within the experimental group, since the subjects reported significantly higher level of autonomy between GAQ2 and GAQ1 as well as GAQ1 and GAQ3. The same applies to GAQ’s categories, although the differences in the means did not reach statistical significance in majority of cases. This facilitative effect of instruction with the use of Internet resources and the virtual world in learning the past simple tense is also visible in the results of ASES. Here, the experimental learners reported overall more autonomous behavior when compared with their control counterparts. It also has to be added the differences in the means reached statistical significance after lesson 1 and lesson 2. A possible explanation of such findings might be related to the fact that the members of the experimental group were provided with the opportunity to learn the item in question practically on their own. They could, for example, select grammar activities available on the Internet, check the answers or repeat the exercises when deemed necessary and use the target structure in practice during conversations conducted in the virtual world. By contrast, the students in the control group studied the grammar structure under the strict supervision of the teacher and did exactly what they had been told to do during the classes.

One of the main pedagogical implications emerging from this research project is related to the changing nature of autonomy and the necessity to foster it in foreign language lessons. In view of the fact that the experimental learners became more autonomous immediately after the treatment and then the degree of their autonomy reduced significantly (i.e. from GAQ2 to GAQ3 when traditional instruction resumed in that group) as well as the continuous, albeit small, drop in autonomy among the members of the control group demonstrate the need to support, encourage and guide language learners, perhaps, throughout their entire foreign language education at school. Another teaching implication concerns the means by which learner autonomy could be
developed during foreign language lessons. Thus, in the opinion of the present author, language teachers should seek opportunities to implement Internet resources and virtual worlds in language classes in order to develop autonomy among their students and, at the same time, create environment for practicing foreign language grammar.

6. Conclusions

The study reported in the present paper contributes to the still limited research into the dynamic nature of autonomy in foreign language learning. It is also one of the first to investigate changes in learner autonomy after a series of English classes. The analysis of the quantitative data collected by means of questionnaires provided evidence that autonomy in foreign language learning is not stable and subject to change over time. At the same time, the study showed that the use of online resources and the browser-based virtual world can become an important factor in increasing the level of autonomy in institutional settings.

It is the belief of the present author that some of the main strengths of the study are related to the involvement of one intact class making up two groups of learners (i.e. experimental and control) and the fact that it took place during naturally occurring English lessons. On the other hand, it needs to be stated that the study has a number of limitations. One weakness is related to the small sample of participants, which reduces the generalizability of the results. Another limitation might be related to the completion of questionnaires, especially those administrated immediately after the treatment and after four weeks, which required the study participants to answer the same questions in a relatively short time separating the measures, thus, making the subjectssimply weary. At the same time, the administration of yet another grammar autonomy questionnaire (i.e. GAQ4) a few months after the intervention, would have surely offered valuable information about the changing nature of autonomy. Despite these problems, the study may still contribute to future empirical investigations into the dynamic character of autonomy in foreign language learning. This is because highlighting this aspect of the construct may encourage language teachers to incorporate in their own teaching practices at least some autonomy and perhaps improve the efficacy of foreign language instruction.

Acknowledgements

The author would like to express his gratitude to Eliza Manuszak for her invaluable assistance in conducting the present study.

7. References


Issues Related to the Detection of Source Code Plagiarism in Students Assignments

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Abstract. Detecting similarity or plagiarism in the academic research publications, source code, etc has been a long time complex and time consuming task. Several algorithms, tools and websites exist that try to find plagiarism or possible plagiarism in those human creative products. In this paper we used source code plagiarism detection tools to assess the level of plagiarism in source codes. We also investigated issues related to accuracy and challenges in detecting possible plagiarism in students' assignments. Results showed that such process or decision is not binary to make and that subjectivity is high. In addition, there is a need to tune plagiarism detection tools to give criticality or weights by users of those tools to categorize and classify different levels of seriousness for committing plagiarism.

Keywords. Plagiarism, code similarity, documents similarity, string search, information retrieval, and search engines.

1. Introduction

In the academic field, one of the major serious problems is the plagiarism problem. There are two major areas of possible plagiarism in the academia. Those include plagiarism in research papers, projects and publications. It also includes plagiarism that is especially applicable for students in the computer and information technology majors. This is the plagiarism in writing code or programs assigned by their instructors. Further, code plagiarism may take several possible forms. In some cases, students in the same class may copy assignments from each other. They may also get their code assignment from external public resources, especially the Internet. In some places, local companies may offer helping students partially or completely in those code projects. The Internet also includes several websites in which students can submit their code assignments and get help from experts through the web. In some cases, this may be offered for financial compensations, it can be offered as part of blogs or websites of experts for free. This link (http://www.ics.heacademy.ac.uk/resources/assessment/plagiarism/onlinesites.html) that is updated by University of Ulster contains a list of several websites that help students (or any person or business for that matter) in their code assignments.

Teaching some computer major courses without tasks, assignments and experiments that include programming is ineffective. On the other hand, instructors struggle to make sure that their students actually performed the tasks themselves without a significant or complete help from others. The Internet and the availability of many websites that can offer help makes it harder for instructors to find possible plagiarism as they will not only look for possible plagiarism among students in their course; they have to search through a vast number of websites, blogs, posts, etc. It may be argued that instructors can solve this through asking for new or different tasks all the time. This can be impossible and time consuming for instructors in courses that are time
consuming also in grading, looking for possible plagiarism, etc. especially when the number of students in such classes is large.

To help instructors in the speed and the accuracy of detecting possible plagiarism, several tools and websites are available: free, open source and commercial. In the following section, we will describe some of those tools.

1.1. Tools and techniques to detect code similarity

There are several examples of source code plagiarism tools. Focus in this section will be on: JPlag, SIM, and MOSS as a sample.

JPlag
While it is not the first source code web-based plagiarism detection tool, nonetheless, evaluations of the tool showed that it is reliable, available for free and easy to use in comparison with many other similar tools (Prechelt et al 2000, and Prechelt et al 2002 ). The paper of (Faidhi, and Robinson 1987) discussed an earlier code plagiarism tool where the tool includes a large set of metrics to compare among the different codes to judge possible plagiarism.

YAP (Yet another Plague) tool of (Wise 1992) discussed also a source code plagiarism tool. Wise released several enhanced versions of the tool later on. YAP itself was an enhancement of an earlier tool called (Plague). User of YAP is allowed to set the cut off percentage to consider the occurrence of plagiarism in the code or not.

SIM
This is a tool that is developed to detect code as well as text possible plagiarism, or even DNA string comparison (Gitchell and Tran 1999). The tool is original developed to compare C program codes. A similarity score algorithm is developed with a value between 0 and 1 based on the level of similarity between the subject codes.

MOSS
This is also another popular free code plagiarism tool. It supports different operating systems. The tool divided the code into several fingerprints and matching or similarity is evaluated based on the number of similar fingerprints between the evaluated codes.

1.2. Techniques to detect documents similarity

In this area, there are many methods to judge similarity between documents. A brute force approach will compare the subject document with investigated documents word by word. However, in most cases, such approach is time and resources’ consuming. In addition, such approach can be easily fooled through editing a small number of words in the document. A more effective approach depends or is based on metrics related to the documents such as the number of statements, paragraphs, punctuation, etc. (Grier 1981, Faidhi, and Robinson 1987 ). A similarity index is calculated to measure the amount of similarity between documents based on those metrics. Comparing the approach of taking the document word by word in comparison to statement or paragraph by graph for example can have several contradicting trade offs. On one side, word by word comparison can minimize the effect of changing one or a small number of words relative to the total document. However, this can be time consuming and word to word
document similarity may not necessarily mean possible plagiarism especially if the algorithm did not take the position of the words into consideration. Documents’ similarity can be classified in different categories. In one classification, they can be classified into: word-based, keyword-based, sentence-based, etc. Sentence or paragraph by paragraph approach is also affected by several variances such as the difference in size between the compared documents and the amount of words edited in those statements or paragraphs.

Hashing algorithms are also used to measure documents similarity. Hashing algorithms are used originally in security to verify the integrity of an investigated disk drive and protected it from being tampered. Hashing can be calculated for a word, a paragraph, a page, or a whole document.

N-gram and Latent Semantic Analysis (LSA) approaches are also different algorithms used in documents’ similarity. The main drive behind using N-gram in evaluating similarity between documents is that similar words will have a high percentage of N-grams in common. In most experiments, n is selected to be two or three. For example, using n-gram for the word “software” and n to be 3, will give the following outputs: ##S, #SO, SOF, OFT, FTW, TWA, WAR, SRE, RE#, and E## where # denotes a padding space. The number of possible bigrams is given by the equation: \( n+m-1 \), where n is the number of possible characters in the word or the string and m is the possible grams. In the previous example, \( n = 8 \), and \( m = 3 \) and hence the number of bigrams is 10. Several text similarity applications such as: information retrieval, natural language processing, OCR, spell checking, etc use n-gram in their text similarity decisions.

1.3. Semantic similarity

Measuring semantic is usually a harder task in comparison with measuring words’ similarity. In documents, semantic similarity between the two documents can be measures based on a similarity index that measures the number of similar words based on several possible algorithms. Statistical means such as vector space models can be also used to measure the amount of correlation between the two subject documents. A topological similarity method is usually used to measure similarities between ontological concepts. Examples of such methods include: edge-based, node-based, pair-wise, and group-wise techniques. In terms of tools, there are some popular tools that are experimented for semantic similarity. Examples of such tools include: Wordnet, MSR, UMLS, SenseBot, SenseLearner, GWSD, and FrameNet. Wordnet uses an extensive word-definition library or dictionary that can be queried for each word in the subject document.

2. Literature review

In this section, we will describe some papers related to plagiarism in general. Then in the second section, we will describe some of the papers dedicated to code plagiarism evaluation.

Manber presented approximate index concept to measure similarity between strings in different documents (Manber 1994). A tool called “Sif” is developed to find similar files in a large file system. He proposed the concept of approximate index to measure the similarity of character strings between documents, which was adopted later by many similar systems.

(Manber 1994) described using a finger print (or what they called anchors) and a fixed number of characters as a baseline to search for plagiarism. In a similar approach and rather than considering a fixed number of characters where changing one character may affect the whole
comparison, we decided to select 4 words as the baseline. An initial method is developed to calculate the most frequent words in a paper and use them as an anchor. This is of course after removing all generic words, prepositions, and any other words that are expected to be seen in any paper (i.e. abstract, keywords, “this paper”, etc). For each occurrence of those frequent words, the algorithm will take 4 words starting from frequent words, and then look in all subject documents for possible matches.

We compared using the most frequent words as anchors in comparison to all documents words. Comparison will be based on two criteria: performance and plagiarism detection. If sufficient number of baselines (i.e. 4-words statements are common to two files (under comparison) then this is a good enough evidence that the two files are similar in some way.

The tool we developed in this paper uses several different search algorithms. The first one searches for possible similar documents for the subject document through a directory of files. The other algorithm searches for similar documents through the Internet. Calculating similarity between documents does not require in many cases similarity in cosmetic attributes such as the file type, size, number of words, etc. He defined a checksum algorithm called “fingerprint” that is based on defining keywords in each document and parse a certain amount of characters starting from those keywords to calculate similarity. In those checksum, anchor words are used from which a certain number of characters is selected and compared among documents. Anchors are created through analyzing text from many different files and selecting a fixed set of representative strings. In somewhat similar approach, we used the most frequent words in the subject word to be our anchors from which the algorithm will start looking for possible plagiarism or sentences’ match.

Some papers tried to tackle the performance problem of finding plagiarism in documents through using indexing (Mozgovoy et al 2005). Such concept is utilized also in search engines for fast document retrieval.

Detecting possible plagiarism in source code is another relevant subject to this paper. In principle, searching for similarities between two code projects is similar to that of documents. However, some cosmetic changes to a source code (e.g. changing all variables, methods, classes’ etc names) can make the new code look different for a code plagiarism tool while in reality it is similar or identical. Based on this assumption (Baker 1993) defined two source codes to be similar if one can be obtained from the other by changing parameter, method, attributes, or classes’ names. He presented several algorithms to identify similar source codes.

We will be contrasting our findings with those obtained using the shingle and fingerprint techniques (Manber 1994, and Broder et al 1997). This technique depends on reducing each document to a series of numeric codes, such as hash codes, based on sequences of words. In the original paper, the authors suggested making each hash code of a group of 10 adjacent words, and moving the window by one word to create the next hash code. They then eliminate duplicates and, to reduce the number of values, save only those divisible by 25. If this is still too many, they save only the 400 smallest values. The advantage of using shingles to compare documents is that a simple set membership between two figures of integers can be computed very rapidly. Documents that match in all shingles are assumed to be identical and those that match nearly all shingles are closely related.

For code plagiarism, several papers are available focusing in this issue. Some papers discuss the development and evaluation of code plagiarism tools such as those mentioned earlier. Other papers focus on the experience of dealing with students’ code plagiarism evaluation. Several papers tried to compare between different source code analyses tools (e.g. Jun-Peng et al 2003, Maurer et al 2006, Kustanto and Liem 2009, Hage et al 2010, etc.). There are several popular tools
such as those described earlier that were the focus of such surveys or comparisons. There are two major criteria upon which such tools are compared. Those are accuracy and speed or performance. In terms of accuracy, metrics are used to measure the ability of those tools to successfully or correctly detect the occurrence of plagiarism. In such scenarios, failures can occur when such tools assume plagiarism while it’s not, or the opposite. Challenges arise in cases where it is difficult to judge plagiarism occurrence (e.g. semantic plagiarism). In terms of performance, it is important for such tools to complete the process in a timely manner. Testing a code project against several other projects, line by line can take a significantly long time.

3. Experiments and analysis

In an earlier paper (Alhami and Alsmadi 2011), we described our implementation of a tool for automatic grading for code homework. The tool is developed based on concept extraction to automatically grade each question in comparison with a typical answer for that question. Rather than looking for a specific answer, the typical answer, which is the baseline for each question that the grading process depends on, include keywords that are expected to exist in the answer.

This includes using JPlag code plagiarism detection tool to evaluate possible code plagiarism among students’ assignments gathered from actual submitted home-works. In Plagiarism, the divided the levels of plagiarism into several levels based on the percentage of similarity between the evaluated codes.

Following is a description of the evaluation experiment along with results analysis. Several code assignments are submitted from students. Students were from 3 different sections.

Task 1: First assignment for the first student section. Five students have submitted the assignments. Results showed that there is no clear plagiarism among student assignments and the percentage of similarity among all assignments in this section is limited to between 0% - 10%.

Task 2: First assignment for the second student section. Six students have submitted the assignment. Two cases of plagiarism in the level: 40-50%, 17 cases between 10-20 % and the rest are in the range of less than 10%. Figure 1 shows a summary of experiment for students’ assignments possible plagiarism in this section. The figure shows the similarity matrix among the different assignments.
Task 3: First assignment for the third student section. Two students have submitted the assignment. Ranges of plagiarism are between 30% and less. Figure 2 shows a summary of this task results.

Task 4: Second assignment for the first student section. Six students have submitted the assignment. Plagiarism levels vary between 60% and below. This is an average level of plagiarism where it can indicate that students are actually copying from each other or from the same source. Figure 3 shows a summary of those results.
Task 5: Second assignment for the second student section. Eight students have submitted this assignment. In this case, serious plagiarism occurred with levels higher than 60% (i.e. 64.8 and 99.7%). Summary of results is shown in Figure 4.

![Figure 4. Assignment 2, Section 2 Results Summary](image)

Task 6: Second assignment for the section three. Seven students have submitted this assignment. So far, this is the most serious case of plagiarism with several almost complete cases of plagiarism. Further, results showed that in some cases more than two students are copying from other. Results are shown in Figure 5.

![Figure 5. Assignment 2, Section 3 Results Summary](image)

Task 7: Third assignment for the first student section. Six students submitted the assignment. Figure 6 shows the results with a medium level of plagiarism.
Task 8: Third assignment for the second student section. Five students submitted this assignment in section 2. Results indicate a significant level of plagiarism among all students. This is somewhat a unique case in comparison to all previous assignments or cases. Figure 7 summarizes the results for Task 8.

Task 9: Third assignment for the third student section. Twelve students have submitted the assignment. Only 7 of those are displayed which showed possible plagiarism. Results in this section showed a significant, even complete, levels of plagiarism where some students are exactly using the code of others. Figure 8 shows a summary of Task 9 results.

**Figure 8. Assignment 3, Section 3 Results Summary**

Task 10: Fourth assignment for the first student section. Eight students submitted the assignments and results of five of them are showed for significant plagiarism. Results showed significant levels of plagiarism among student codes. Figure 9 shows a summary of the results of Task 10.

**Figure 9. Assignment 4, Section 1 Results Summary**
Task 11: Fourth assignment for the second student section. Only assignments of two students are evaluated. Figure 10 shows a summary of the results.

![Figure 10. Assignment 4, Section 2 Results Summary](image)

Task 12: Fifth assignment for the first student section. Six of ten submitted assignments are evaluated for possible plagiarism. There is a significant level of plagiarism in some of those assignments in comparison to the others. Figure 11 shows a summary of the results.

![Figure 11. Assignment 4, Section 3 Results Summary](image)

Upon manual review of the students assignments we found out that plagiarism detected by the tool can be classified under the following categories:

In some cases, the plagiarism detection is (false alarm) where the tool by mistake decided that some similar use of variable or method declarations is a possible plagiarism. We know that in programming or code, there are some parts that can be identical between all assignments and those are part of the programming language built-in names that will be the same in all tasks if they are used.

On the other side, manual detection of students’ code assignments showed that some students are clever in a since that they can mislead code plagiarism tools. This is as they change variable and method names while in reality the majority of the code among the different assignments is the same. However, such semantic type of plagiarism is still a challenge for all types of plagiarism detection tools.

On the third level of manual code plagiarism observation, our observations showed that code plagiarism tools that can a useful effective tool for instructors for initial location of possible high
plagiarism levels. While some percentage of error in plagiarism detection can be noticed, on the other hand, they are able to give initial indicators of plagiarism especially in cases where such plagiarism is high and obvious. Such task can be tedious and time consuming to perform manually.

4. Conclusion

In this paper, we evaluated the use of a code plagiarism tool for possible detection of code plagiarism in students’ assignments. Such task can be tedious and time consuming to be performed by instructors manually. In addition, there are two major categories of possible source of plagiarism. Those are the Internet and students’ team mates. In code plagiarism tools, there are two major criteria that are used to evaluate the performance of such tools. Those are accuracy and speed or performance. In most cases, those two quality attributes conflict with each other.

While code plagiarism evaluation for students’ assignments showed that code plagiarism tools may show false alarms in many cases, however, results showed also that such tools can be very helpful in initial investigation for possible plagiarism and they can be very effective useful tools for instructors in this field.

References


Text Generator: an Aid for Writing in the Tertiary EST Class

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Abstract. This paper analyses the development of teaching LSP (Language for Specific Purposes) as well as the introduction of technology in the classroom from the 60s onwards. This evolution has favoured the growth of ICT (Information and Communication Technology) tools, not always intended for the classroom but very useful to introduce tertiary level learners of ESP (English for Specific Purposes) into a real context. One of these tools is the text generator, meant for Spanish-speaking specialists of a field to assist in their writing. This linguistic tool has been created taking into account the principles of contrastive analysis, genre rhetoric and corpus linguistics. After reviewing the process of how it was created, there is also an exemplification of task-based activities that can be developed in the classroom using a text generator.

Keywords. ESP, ICT, contrastive analysis, genre rhetoric, text generator

“Someday, in the distant future, our grandchildren's grandchildren will develop a new equivalent of our classrooms. They will spend many hours in front of boxes with fires glowing within. May they have the wisdom to know the difference between light and knowledge.”

Plato (427 BC – 347 BC)

1. Introduction

Teaching EST (English for Science and Technology) at tertiary level encounters the general problems of teaching LSP (Language for Specific Purposes). The approach to LSP teaching has changed throughout the last fifty years focusing first on the language and later on the learner (Upton 2012), and together with the latest technological innovations in the field of the ICT tools, vast changes have taken place in the classroom. The lecturer can nowadays benefit from a wide range of ICT tools such as e-mail, blog, forum, Moodle, etc. Nonetheless, all their possibilities are not always exploited with a pedagogical intention. This paper introduces another tool, the text generator, developed by the ACTRES research group, and it shows its underlying linguistic principles – contrastive studies, genre rhetoric and EST –, how it was developed and how it could be used in a real context such as a tertiary level class of EST.

2. Teaching LSP/ESP

Teaching a language for a specific purpose is completely different from teaching a second language for general purposes. There are different factors that make it distinct, such as motivation, needs of the student, socio-cultural aspects as well as the use of specific terminology, grammar structures, etc.

The main factor is its purpose, the need of certain language for a particular aim (Huckin 2003) as could be “Spanish for tourism”. Both the language taught and the specific purpose make a cluster, for this reason there is a great need of teaching tools and materials (Upton
because the combinations of language and purpose are endless and very different in each context.

Most of the time when we refer to LSP, the language referred to is English, this has made the acronym ESP also well known, and its use is often interchangeable (Belcher 2009). The reason for this is that “English is by far the most prominent language that non-native speakers are wanting, needing or expected to learn in particular contexts” (Upton 2012: 13) although there are also other emergent languages such as Spanish, due to the “economic and political development of Spanish-speaking countries in Central and South America” (Sánchez López 2010), or Chinese and Arabic (Kanoksilapatham 2012).

In the case of science and technology, English is the language used internationally, for example in conferences that are held outside English-speaking countries (Benavides et al 2003), this makes English a key element for Spanish tertiary students in the technical area. We will refer to it as EST (Trimble 1985), and this is the context in which this research takes place.

“Ideally, LSP teaching should be based on subject-matter content that is recognizably part of the student’s own discipline or in any case something the student knows that he or she needs to learn. This gives it face validity in the eyes of the student and is likely to increase the motivation to learn.” (Huckin 2003: 5)

This motivation should be enough in itself for tertiary students to be willing to learn EST, but the fact is that many of them (most of them from my personal experience) would not enrol an EST course unless it was compulsory to graduate. The relationship between EST and learners is somehow problematic, as they do not feel the need for learning a second language in their first year of university, they see the professional environment in the long distance and a language course is very much aside their “technical” interests. There is a wide range of negative attitudes towards the EST class, ranging from the attitude of the I-already-speak-English learner to the I-can’t-cope-with-English learner. The first attitude is the most problematic, as this learner shows very little or no interest at all, seldom attends to class, he/she doesn’t have an excellent mark and in the end he/she will question the whole course because it didn’t fulfilled his/her expectations. The other attitude described can be better handled if the learner has a positive attitude. The main problem the lecturer has to face is how to catch the attention of the latter and make the subject attractive. This usually implies paying particular attention to low-level learners and offering extra material and resources for them to practice. If the lecturer succeeds in helping them keep a positive attitude, they will finally pass the course, even with a good mark.

The relationship learner-language has changed its focus since the beginning of LSP as a field of applied linguistics in 1962 (Swales 1985). Upton (2012) establishes four periods from that point of departure. The first one is centred in identifying the specialized language in a specific context. At this time, there was a very close analysis on vocabulary and language structures (Halliday, McIntosh & Strevens 1964: 189). The second period would be around the mid 70s when the focus is moved to “language-using purposes of the learner”. This means that at that moment, communication skills are also taken into account as well as vocabulary, themes, etc. (Strevens 1977). The third period would be in the late 90s in which there is a shift to the specific needs of the learner including wants, skill/knowledge gaps, etc. And the language studied is not deconstructed into small pieces but the whole “discourse and the genres appropriate to these activities” are considered (Dudley-Evans & St. John 1998). After this turning point, there has been a change towards “finding out what the learner needs are” (Belcher 2009: 3), understanding the language use in specific contexts (Belcher 2004) and “developing or adapting materials and methods to enable needs-responsive instructions” (Belcher 2009: 3).
This shows the evolution from the dawn of ESP, when the centre was the language in itself, and then, step by step there has been a slow evolution towards learners and language in context. The role of the teacher at this point is that of a facilitator and the learner is the centre of the learning process (Huckin 2003: 11).

One of the things the teacher has to decide is how specific the language needs to be; this is called the narrow/wide angle (Jordan 1997). With a small group of learners it is easy to establish a narrow angle, and the teacher can focus on very specific content, which is usually motivating. But with heterogeneous groups there is no other option than a wide-angle perspective (Huckin 2003).

The challenge for today’s teachers is to empower learners and to help them to develop the skills, strategies and perspectives they need to “take responsibility for their own development as specialist insiders when they are no longer in the LSP classroom” (Upton 2012: 22).

3. Teaching with ICT

We can refer to Benavides et al (2006) to have an outline of the evolution of the use of the computers in the classroom. Around 1960s computers were introduced for the first time in the classroom, and then in the 80s the use of CALL (Computer-Assisted Language Learning) began to extend for manipulating words and phrases but with the added value of an immediate feedback for the learner. This is a prescriptive and passive kind of learning (Read et al 2011) and it doesn’t really make a difference with other traditional written material in its concept, the contrast is only made in its format. In the 90s, CD-ROMs were widely used, mainly for installing programs on the students’ PCs, but the use of it did not evolve much more. From 2000 to nowadays it is the use of the Internet that has taken the baton. Internet is a tool that provides material in the form of hypertext and multimedia, and this can be accessible via web pages. The main difference with software and CD-ROMs is that learners don’t have to care for anything, they just need a mobile device such as a laptop, tablet or even smartphone and an Internet connection. The rest would be provided by the web page and the tasks previously prepared by the teacher. Upadhyay (2006) states, “online learning is considered as the extension to distance and distributed learning. An important aspect is to customize learning for students and to make it available at anytime, anywhere”.

Mullamaa (2010: 39) has also explored the possibilities of the ICT and suggests, “web-based solutions offer the learners the possibilities for making the learning process more interesting and challenging”. As we have seen before, today’s teaching trends make the learner the centre of the learning process and ICT tools are a good resource for this purpose as most of the times the activities designed are task-based and “students benefit with behavioural objectives” (Read et al 2011). The problem these authors find is analysing what learners produce, which can be endless work.

The different resources that can be used in ESP are those general tools such as e-mail, forum, blog, course plan and calendar among the main ones. ESP can also benefit from those tasks designed specifically for second language acquisition such as on-line grammar and vocabulary exercises, texts to read and discuss, on-line dictionaries, multimedia material, etc. One more tool that can be added to the list is the text generator designed by the ACTRES project (Contrastive Analysis and Translation English-Spanish in its Spanish acronym), which will be described in detail later on.

There are different opinions about ICT tools, “some educationalists appreciate its values, others tend to be rather reserved to the option of having the electronic environment overtake

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1 See http://actres.unileon.es/ for further details.
“the classroom” (Mullamaa 2010: 38). Other teachers just don’t know how to integrate them in their work (Zabalza 2003).

As Mullamaa (2010: 38) points out, ICT supports the modern principles of learning and language acquisition: individualisation, interaction and motivation. Individualisation is reached by means of promoting the autonomy of the student. Having a set task with a deadline, and the means to do it when best suits students, makes them organise their time and duties and from an individual and personal perspective, this way they do not depend on the class, the teacher or the rest of their colleagues. This provides a high degree of flexibility, as the individual feels free to find the best time for doing the task. The interaction that ICT tools provide is virtual, as learners are working individually, they can exchange views and opinions with other learners on forums and blogs, and even pose a question to the teacher, learners don’t have to wait for the next classroom session or attend an individual tutorial to clarify it. ICT tools also provide extrinsic motivation, as learners don’t feel like it is “the old written method” for learning English.

On the contrary, disadvantages may also be encountered, for example when learners may find that there is no Internet connection, they may feel alone and with no immediate support, they may not take the task seriously (Sweeney 2010) and it may be difficult and time consuming for the teacher to design a task.

Nonetheless, as Díaz et al (2006) state, ICT tools can be used to achieve the three generic competences: i.e. (a) instrumental (cognitive, methodological, technological and linguistic abilities), (b) interpersonal (individual abilities, social interaction and co-operation) and (c) systemic (abilities and skills concerning whole systems). Teachers in general agree in keeping tasks simple, clear and well structured to have success. If students feel they can accomplish the task they will be motivated. This is what can be called the Occam’s Razor: keep it simple and you’ll achieve it (ibid.). As a final recommendation, Raïsanen (2004) proposes to opt for real tasks, if learners feel the task has a real purpose, this would keep them motivated. ICT tools are not the panacea to all the problems the teacher and the learner may encounter in the EST classroom, but it is a handy tool that we can get profit from, and it still needs a great deal of testing to get the best of it.

4. Text generators

Text generators² have been designed to aid professionals of a specific field with the composition of scientific and technical texts in English. There are different text generators for different purposes and they support the user (a speaker of English as a foreign language) throughout the composition process by offering the most appropriate suggestions where grammar is concerned. This is achieved by means of a user-friendly, productivity-driven interface. The text generator that will be treated in this paper is a Technical Instructions Generator (TIG), aimed to assist in the composition of home appliances instructions’ manuals. The pedagogical applications of a generator of these characteristics for an EST class in the tertiary level will be shown in section 6.

4.1. Underlying principles

Before we see the text generator, it is crucial to know on which theoretical principles it has been based. The two main principles are contrastive studies and genre rhetoric.

Furthermore, because of the specific characteristics of the TIG, it can be added that the scientific and technological language is also another important area to be studied.

4.1.1. Contrastive studies

The first notion taken is James’ (1997: 3) Contrastive Analysis, which states that two languages can be compared based on the universal properties of language (Chomsky 1965: 35). These common characteristics of every language make the basis of an analysis of different realisations in different languages. There is a common deep structure to every language and this is the reason why we can translate from one language to another (Chesterman 1998: 32). It is Chesterman (ibid.) who gives us a methodology of investigation in “Contrastive Functional Analysis”. We have to begin looking for similarities in two languages, as well as different ways of expressing the same meaning. This kind of CA is also called “functional” in the sense that it is based on meaning and it follows the onomasiological pathway, from meaning to form (Bondarko 1991).

The implications of linguistics in teaching are therefore clear (James 1997: 141) as any study based on CA in two languages serves as a basis for making learners aware of language differences. For a CA of this kind two main steps should be followed, “first, there is the stage of description when each of the two languages is described on the appropriate level; the second stage is the stage of juxtaposition for comparison” (James 1997: 30). These different levels that are mentioned are those of the language, a language can be compared in terms of phonology, lexis and grammar. James states that this should be the ideal, to compare two languages at the same level, but sometimes, these levels need to be crossed, what is called “interlingual level shifts” (ibid.). Once we are sure what the object of the comparison is, then the “tertium comparationis” can be established (ibid.: 58). The TC can be a small unit of comparison but it can also extend into broader terms, Hymes (1972), for example, proposes to focus on the speaker’s communicative competence to make a linguistic enquiry, we are moving then from micro- to macrolinguistics.

4.1.2. Genre rhetoric

Genre rhetoric gives the perspective needed for a macrolinguistic analysis. As well as Hymes (ibid.), mentioned above, other scholars have taken this same point of view. Werlich (1983) in “A Text Grammar of English” takes the whole text as a point of departure, a top-down perspective, and not the bottom-up angle as other previous more traditional grammars. Halliday & Hassan propose a model in which no distinction is made between grammar and semantics, but identify the role of different linguistic patterns in terms of function creating meaning. This way a text can be studied attending to the pattern and, as we can find repetition of the same pattern in other texts we can name it a “genre” (1989: ix).

A genre has to take place under the same conditions; it is a similar communicative process that occurs in a social context. The social context can be analysed under three dimensions: “field”, “tenor” and “mode”. The field is what is happening; the tenor, the people who are taking part; and the mode, the part the language plays (Halliday & Hassan 1989: 12).

Different texts belong to the same genre when they have the same function and they are similar in structure, this makes a genre be recognizable (Swales 1993: 9) or what Bhatia expresses as “recognizable communicative events characterized by a set of members of the professional or academic community in which it occurs” (2004: 23).
Halliday & Hassan also postulate that language is functional, this means that it performs a task in context. The different words and sentences in the text build up a meaning; a text is essentially a semantic unit (1989: 10).

4.1.3. Language for Science and Technology

The area of LSP/ESP on which we are concentrated is LST (Language for Science and Technology). LST is a specialized language although there are different levels of specialization. These levels can be arranged from the most specialized, as the one between scholars, to the slightest specialized, as the language that we can find for the general public (Pearson 1998: 35-39; Buendía & Ureña 2010: 172). In a tertiary LSP/ESP class, a mid level of specialization is going to be found in the negotiation between lecturer and learner, although learners will have to face high level of specialization texts in a passive approach, and they should be able to produce at least low-mid specialized speeches and mid specialized texts.

The characteristics of LST are: precision, neutrality, economy and other resources. Precision is understood as a way of avoiding ambiguity. Neutrality is shown as personal opinions and subjectivity is rejected. Economy of the language is essential in LST, abbreviations, acronyms, symbols are very much used and it plays an important part in the syllabus of LST. The other resources previously mentioned are those referring to formulae, tables, charts, diagrams, etc. (Gutiérrez Rodilla 2005). Among the grammatical characteristics that can be found in EST, Dudley-Evans & St. John (1998: 77) enumerate: short and simple structured sentences, without subordination; avoidance of personal opinion, no use of exclamations nor other expressive resources and impersonal formulae such as the passive and nominalizations.

Besides this microlinguistic approach to EST, Trimble (1985) makes also an analysis of the rhetorical functions that can be found. These are: description, definition, classification, instructions and visual-verbal relationships. A tertiary EST syllabus should be built around these five functions.

<table>
<thead>
<tr>
<th>Description</th>
<th>Physical description</th>
<th>Function description</th>
<th>Process description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Definition</strong></td>
<td>Simple/single-sentence definition</td>
<td>Formal definition</td>
<td>Semi-formal definition</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Non-formal definition</td>
</tr>
<tr>
<td></td>
<td>Complex definition</td>
<td>Stipulation</td>
<td>Operation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Explication</td>
</tr>
<tr>
<td><strong>Classification</strong></td>
<td>Direction of the classification</td>
<td>Finding the members of a given class</td>
<td>Finding a class for one or more given members</td>
</tr>
<tr>
<td></td>
<td>Explicit</td>
<td>Full classification</td>
<td>Partial classification</td>
</tr>
<tr>
<td></td>
<td>Implicit</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Instructions</strong></td>
<td>Telling someone what to do</td>
<td>Direct instructions</td>
<td>Indirect instruction</td>
</tr>
<tr>
<td></td>
<td>Instructional information</td>
<td>Explanations</td>
<td>Theory</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Warnings (or any other additional information)</td>
</tr>
</tbody>
</table>
5. Design of TIG

The TIG has been centred on one of the previous rhetorical functions discussed: the instruction. The way a learner will face this function in a real context will be reading and producing written instructions manuals. For this aim, a corpus of 40 home appliances instructions’ manuals in English and other 40 in Spanish, with over 380,000 words, have been compiled in order to get the idea of how this genre is organized and what kind of language is the one used in the different parts of the text. These parts are named “moves”, “steps” and “substeps” after Swales (1993: 140-41). Once the corpus was studied, this is how the instructional genre was organized.

<table>
<thead>
<tr>
<th>Moves</th>
<th>Steps</th>
<th>Substeps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identification</td>
<td>Manufacturing company</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Name</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Model</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Artwork</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Elements</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Purpose</td>
<td></td>
</tr>
<tr>
<td>Objective description</td>
<td>Technical data</td>
<td></td>
</tr>
<tr>
<td>Functions</td>
<td>Installing</td>
<td>Installing stages</td>
</tr>
<tr>
<td></td>
<td>Operating</td>
<td>Operating stages</td>
</tr>
<tr>
<td>Advice</td>
<td>(Extra) tips</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dos</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Don’ts</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maintenance</td>
<td>Maintenance stages</td>
</tr>
<tr>
<td></td>
<td>Troubleshooting</td>
<td>Problem/solution Guarantee</td>
</tr>
<tr>
<td></td>
<td>Safety information</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Recycling</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Company information and Costumers’ service</td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Moves, steps and substeps of TIG

With the aid of the ACTRES tools, it has been possible to manage the great amount of data. The first step was to annotate the corpus according to the organization established (table 2). This has been done with the ACTRES tagger (figure 1).
Once this step has been done it was possible to extract the language of each move, step and substep with the ACTRES corpus browser (figure 2).
With this method the prototypical (Rosch 1978) language of each move, step and substep was established. The language offered in the TIG has been extracted from real texts that can be found nowadays in the market, it is a descriptive point of view of the language, not prescriptive. Taking this stage as a point of departure, the TIG can be used for helping learners to build an appliance instructions' manual.
When opening the TIG learners have an outline of the different moves, steps and substeps of the instructions’ manual on the left hand. This is fully developed on the right hand. When learners start working on their texts they get a description in Spanish of the piece of text that is required. A menu is displayed with different suggestions on how to build up a sentence; there is a kind of “English skeleton” together with an explanation in Spanish on what is needed to complete it. To make it easier, each choice is accompanied by an example. Then, learners write their own sentences in the box. If learners don’t know the exact words in English, they can write it down in Spanish and they will get some English options from which to choose, this is a glossary of English terms. This process is repeated until the whole manual is completed. Once this is done, learners can go to “Vista previa” (preview) and have a look at the manual, if there is something that needs amendments they can go back and correct whatever is necessary. When the text is finished, it can be downloaded as pdf or doc document.

6. Advantages of using TIG in class

The following points will recapitulate what has been established so far and how the TIG is a tool that meets the last trends of ICT tools together with a solid theoretical background:

- To begin with, the TIG is a tool that focuses on a specific purpose of language, EST. For this reason it is aimed for tertiary level learners of English as a second language in a scientific and technical context.
- It meets the requirements of ESP teaching and learning. The role of the lecturer is that of a facilitator, and the learner is at the centre of the learning process. It empowers learners as experts of their own technical knowledge rehearsing in a real context. Do not forget that the TIG is not a pedagogical tool in its conception, but an aid for the professional of a specific field.
- It is focused not only on grammar and vocabulary but also on the discourse, the specific genre of a whole community of experts. From this point of view a narrow-angle perspective is possible to follow even with a large number of learners.
- As an ICT tool, it is at the forefront of technology, it is web-based, available everywhere at any time with an Internet connection device (PC, laptop, tablet…).
- It is an ideal tool for designing a task-based activity, which has been proved as a motivating resource in previous studies (Mullamaa 2010), in this case to write an instructions’ manual.
- It promotes the modern principles of learning and language acquisition: individualization, interaction and motivation (ibid.).
- It has been linguistically designed based on a solid theoretical background: contrastive studies (CA and CFA), genre rhetoric and EST.
- It has been designed on the basis of a linguistic corpus of real texts that can be found on the market at the present moment, taking a descriptive perspective, not prescriptive.

7. Use of TIG in teaching EST

Here, an example of task that can be performed in a tertiary EST class is presented. In appendix 1, the students’ task sheet is provided.

Task: Writing a home appliance instructions’ manual (lecturer’s notes)
Type of activity: Individual task with peer-assessment
Classroom requirements: Computer lab with Internet connection or students can bring their own laptops if Wi-Fi connection is available in the classroom.

Session 1
- Students find a real home appliance instructions’ manual in English. If you want students to bring it physically (on paper) to class you should warn them in the previous session. Alternatively, they can find one on the Internet with their own PC/laptop in the classroom.
- Make sure they do this individually and that they all have a different appliance. Check and comment on what they have found and give feedback. Depending on their level guide them to find a complex or simple appliance. For example, washing machines or dishwashers are good for high-level students; low-level students can do better with blenders or hair dryers.
- Set the next step to be done individually (either at home or in class, as best suits you): students have to imagine that they have invented a new appliance that substitutes/is better/more advanced than the one they have found and they have to write a new instructions’ manual for it. Students make a draft of the new characteristics and functions.

Session 2
- Make a revision about the characteristic language used in instructions’ manuals. See appendix 3 for reference.
- Show students how to use the TIG and make them practice for a while. Comment and give feedback.
- Establish pairs of students and make them take note of their partner’s e-mail. Depending on the length of the session they can start working individually or you can set the task for homework.
- Establish a date on which students have to send their instructions’ manual to their partner together with the original instructions’ manual for reference (in case something needs checking). This should be done on a Word document; make them aware they should not introduce any restrictions to the document; no pdf or other restricted documents are allowed.
- Establish another date for students to give the feedback to their partners. They should write their comments using Tools > Track Changes in the Word document and send it back by e-mail. Make clear that students cannot modify anything without leaving the trace. Make them also aware of the assessment criteria (appendix 2), what they have to look for, and what they should comment on. If necessary, post them on the Moodle, blog, etc. you use for exchanging information with the students.
- Establish a deadline on which students have to send you their final draft.

Individually (homework)
- Students get their partner’s feedback and decide which comments they incorporate and which comments they do not include in their final draft.
- Students send their final draft to the teacher. It is also very advisable to send your comments back to the students so they are aware of any improvement.

High-level students
For high-level students you can skip the first step of finding an instructions manual, they can design/invent their own home appliance, it does not matter if it is not technically possible
to make. This step can also be adapted to the different technical areas of the students; the invention can be mechanic, electronic, etc. The rest of the activity would be the same. You can introduce a final session for students to make an oral presentation of their inventions and explain the rest of the class how it works.

8. Conclusion

I have tried to analyse the surrounding circumstances of a nowadays EST tertiary classroom, the way the teaching approach to it has changed throughout the last half century and what are the new elements that have been lately introduced. One of these elements is the TIG. The development of the TIG has been made according to the latest linguistic trends such as contrastive studies, genre rhetoric and EST; it is not only a technical tool but also a linguistic one.

The main advantages of this tool in the EST class are: (1) its specificity, it is focused on technical language; (2) from a pedagogical point of view, the centre of the learning process is the learner, not the lecturer; (3) it promotes the modern principles of language acquisition: individualization, interaction and motivation; (4) writing is developed not only from a microlinguistic perspective, but also presenting the instructions’ manual as a genre and with a well established structure; (5) it uses the latest technology, it is web-based and available with an Internet connection; and finally, (6) students train in a real context, the TIG is not a pedagogical but a professional tool in its conception.

The last part of this research was developed from a very practical perspective. Of course this is not the only way the TIG can be used in an EST class, but this proposal is meant as an exemplification of how it can be exploited and it is open to more possibilities.

Acknowledgements

I am grateful to Dr Labrador de la Cruz and Dr Díaz Prieto for all their support as well as their valued comments on this paper.

Appendix 1 – Students’ notes for the task

Task: Writing a home appliance instructions’ manual

- Find a home appliance instructions’ manual in English. You can look for one at home or find it on the Internet. Bring it to class.
- Imagine that you are an engineer working for that company and you have invented a new appliance that substitutes, is better or more advanced than the one you’ve got. You have to write a new instructions’ manual for it. Make a first draft of the new characteristic and functions.
- When you have a clear idea, write your new instructions’ manual using the TIG. Save it as a Word document with no restrictions, no pdf is allowed. Send it to your partner together with the original instructions’ manual for reference.
- When you receive your partner’s instructions’ manual you have to comment on it following the assessment criteria. Do not comment on anything that crosses your mind and explain your comments to make them clear. Use the Tools > Track Changes tool.
in the Word programme to write them, be careful to leave a trace of any change that you make, do not change or delete anything directly. Send it back to your partner.

- Read your partner’s comments on your manual and accept those good comments and reject others if you think they are not appropriate. Send your final draft to the lecturer.
- Pay attention to these dates:
  - (date) – Send your instructions’ manual to your partner.
  - (date) – Send your feedback to your partner.
  - (date) – Send your final draft to the lecturer.

Appendix 2 – Assessment criteria

(The percentages are only illustrative)

Content (20%)
Is the invention presented original? Does it represent a great change with the previous appliance presented?

Text structure (20%)
Is the whole text coherent and complete? Does it lack any of the important parts of an instructions’ manual? Is the information balanced? Or, is there too much information/ description about one thing and not on another?

Paragraph structure (20%)
Are the paragraphs well structured? Is there internal coherence of the paragraph? Or are there different ideas mixed together? Is there cohesion between one paragraph and the next one?

Use of language (20%)
Is the language used appropriate for the context? Too formal/informal? Are there any grammar problems? Is it correctly used? Are there any misspellings?

Oral presentation (20%)
Explanation of the content: Is it clear? Does the audience understand it? Attention to the audience: Does the student pay attention to the audience? Or is he/she just reading notes? Does he/she get feedback/interaction from the audience? Use of classroom tools: board, interactive white board, images, ppt… Speech: Is it clear? Fluent? Accurate?

Appendix 3 – The language of instructions

Instructions are clear and detailed information on how to do something, especially in written form. There are two types of instructions: direct instructions and indirect instructions.

Direct instructions
Direct instructions are characterized by the use of the imperative form of the verbs. Remember the imperative form of a verb is made with the infinitive without the particle “to”.
They are usually in the form of a numbered list; that is, a set of steps in the order in which they are to be done:
1. **Remove** all packaging, stickers or other accessories from the inside and outside of the kettle.
2. **Place** the appliance on a flat and stable surface.
3. **Fill** it with water…

For negative instructions, we use the auxiliary “do not” or “don’t” before the infinitive without “to”:
- **Do not put** anything on top of the appliance.

Indirect instruction
Indirect instructions are characterized by the use of a modal verb. The modal verbs used are “should”, “must” or “can”:
- You **must switch off** the appliance after use.

Impersonal instructions are also very common. The impersonal instructions are made with the passive of “should”, “must” or “can”:
- The appliance **must be switched off** after use.

Instructional information
Instructional information helps the reader to better understand the instructions. It is always associated with either direct or indirect instructions. They add cautions, warnings, recommendations and suggestions, specifying statements, notes, etc.:
- Check the main voltage **before plugging it**.  
  (Based on Dr Díaz Prieto’s notes)

**References**


The Effect of Practicing Extensive Reading through Web-Based Inquiry Learning Environment (WebQuest) on Intermediate EFL Learners’ Reading Comprehension and Vocabulary Achievement

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Islamic Azad University at Central Tehran, Iran

Abstract. Educators agree that Internet resources can be a valuable learning tool for students to find information and apply them in learning. Among many Web-based applications in education, WebQuests have become popular learning tools in English as a Foreign Language (EFL) reading because they provide learners with authentic tasks to motivate students’ investigation of a central, open-ended question. The purpose of this study was to investigate the impact of Extensive Reading through WebQuest on EFL learners’ reading comprehension and vocabulary achievement. For this purpose, 60 intermediate EFL learners were selected based on their PET scores and were divided into control and experimental groups. In both groups Extensive Reading was practiced; in the control group the learners had to read short story books, but in the experimental group the researcher introduced a WebQuest through which students practiced the same short story. At the end of the study, a vocabulary and a reading comprehension posttest was administered and the results were analyzed by MANOVA. The results indicated that WebQuest had a significant impact on the reading comprehension of the experimental group, but no significant difference was observed between the vocabulary mean score of the control and experimental groups.

Keywords. reading comprehension, vocabulary achievement, Extensive Reading, WebQuest.

1. Background and Purpose

1.1. Introduction

Reading is an important skill for English language learners in today’s world. It is by reading that language learners learn much of what they need to know in order to improve their general English. It supports the development of overall proficiency and provides access to crucial information at work and in school. Educational researchers have found that there is a strong correlation between reading and academic success (Pretorius, 2000). In other words, a student who is a good reader is more likely to do well in school and pass exams than a student who is a weak reader.

According to Shoebottom (2010), good readers can understand the individual sentences and can guess the meaning of many unfamiliar words from the context while they know most of the words in the text already. He also maintains that they can use dictionary effectively to help them understand the meaning of new words. Furthermore, he asserts that they can comprehend ideas, follow arguments and on the whole they can quickly extract from a text what is important for a task they are employed in.

Educational researchers have also found a strong correlation between reading and vocabulary knowledge (Alderson, 2000; Qian & Schedl, 2004; Zhang & Anual, 2008). For second language learners, vocabulary assessment can reveal the extent of the lexical
gap they face in coping with authentic reading materials (Read, 2007). In other words, students who have a large vocabulary are usually good readers. One of the best ways to acquire a large vocabulary is to carry out Extensive Reading as Day (2008: 1) puts it: “It is not surprising that Extensive Reading helps students become better readers”. Therefore, if one reads extensively, one is likely to become a good reader. Nowadays, with the progress of technology, computers have become a part of people’s every day tools. More and more people are using computers at work and home, and it seems impossible to avoid using computers. Computers in turn, have resulted in the advent of another technology, namely, the Internet. In this information age individuals receive huge amounts of information via the Internet with the click of a mouse. Castells (2001: 44) believes that, “we live in the Internet Galaxy”. In fact, “The Internet is not just a technology. It is the technological tool and organizational form that distributes information power, knowledge generation and networking capacity in all realms of activity” (Castells, 2001: 52).

In order to survive in this information age, one needs digital literacy. In this regard, Chatel (2002: 12) maintains that, “A literate person in the digital, information-oriented society knows how to gather, analyze, and use information resources to solve problems and make decisions as well as how to learn both independently and cooperatively”. Making use of the Internet as an informational and technological tool, WebQuests, developed by Bernie Dodge and Tom March in early 1995, are inquiry-oriented activities in which most or all of the information used by learners is drawn from the Web (Dodge, 1998).

Since the mid 1990s, educators have searched for ways to make effective use of the vast information resources available on the web. McNerney (2002) asserts that the WebQuest approach is a nontraditional instructional method for teaching subject area content through using multimedia and computer generated web-based instructional activities. WebQuests integrate the World Wide Web into classroom activities and encourage students to use higher order thinking skills to solve a real messy problem. According to March (2008), a good WebQuest prompts the learner to apply higher order thinking skills (analysis, synthesis and evaluation). Students are provided with online resources and are asked to use this information constructively to solve the presented problem rather than just cutting and pasting material into an assignment or project.

WebQuests are designed to use the students' time well, focus on using information rather than searching for it, and support students' thinking at the levels of analysis, synthesis and evaluation. Most schools cannot afford the time or resources required to allow students to browse the Internet without a clear purpose in mind, and there is doubtful educational benefit in doing so. WebQuests allow students to use the Internet without the arduous task of filtering through the mountains of information contained within it. Teachers have done this work already. As March (2003: 42) maintains, “The best WebQuests inspire students to see richer thematic relationships, to contribute to the real world of learning, and to reflect on their own metacognitive processes”.

In order to deal with information we must be able to read and understand it and even more importantly, to use it significantly (Albion & Maddux, 2007). According to Verhorven and Snow (2001, as cited in Barros & Amorim Carvalho, 2007), research shows that Extensive Reading may help develop reading skills provided that the students do the task successfully. They further maintain that reading demands not only a series of skills, but also motivation which plays an important role during the process. Barros and Amorim Carvalho (2007: 38) maintain that, “WebQuests can be balanced
and structured activities for an Extensive Reading task. They can be motivating, having the potential to help students look at Extensive Reading differently”. Furthermore, according to Laborda (2009), although vocabulary is usually acquired through oral interaction, learners can improve their vocabularies through reading with WebQuest being a potential source for it. The Internet offers a unique opportunity for natural unmodified input that textbooks can seldom present. It has been claimed that technology such as WebQuests can provide opportunities for collaboration and the practice of integrated language skills such as reading, writing, and speaking (Kocoglu, 2010). Also WebQuests are claimed to be beneficial for ESL/EFL learners due to exposing the learners to authentic materials and meaningful content and providing the possibilities for real communication in the target language (Simina & Hamel, 2005; Stoks, 2002). Conclusively, the resources offered by the Web can be seized to build open and motivating tasks and bring learning near to the student’s classrooms.

1.2. Statement of the Problem

In everyday life, to read extensively means to read widely and in quantity. According to Smith and Elley (1997), pioneers such as Harold Palmer in Britain and Michael West in India worked out the theory and practice of Extensive Reading as an approach to foreign language teaching in general, and to the teaching of foreign language reading in particular. They further maintain that research has confirmed that Extensive Reading is beneficial to the learners in terms of increasing print exposure, writing ability, receptive and productive skills, and vocabulary acquisition. Nevertheless, one problem is that many students do not like reading in a foreign language. According to West (1955) and Dupuy, Tse, and Cook (1996), it has been widely observed that a consequence of traditional intensive approaches to foreign language reading instruction is that students do not actually read very much. According to Barros and Amorim Carvalho (2007), learners often find it a difficult task mainly due to the high number of unknown words they encounter when reading a text. Shoebottom (2012) maintains that another difficulty arises in cases where the necessary background knowledge is missing or learners lack motivation.

Szynalski (2001), likewise, notes that one of the reasons why learners do not want to spend their time on reading is that they associate it with unpleasant things. He gives an example by maintaining that when they think ‘reading a short story’, they think about boring stories and poorly black and white printed and boring exercises. He also maintains that in their minds, this reading is something they have to do, not something they want to do. Number one of William’s (1986: 42) ‘Top ten’ principles for teaching reading is that “in the absence of interesting texts, very little is possible”. Therefore, it seems that merely providing reading materials is insufficient, rather according to Clarity (2007), reading needs to be associated with an enjoyable activity.

Today increasing access to the internet has brought the world into the classroom. Krajka (2000) holds that online instruction provides recency, variety and choice to the classroom. He also believes that online lessons add new flavor to the classroom and
believes that internet instruction can spice the classes up with some new elements. Schmidt (1999) raises the issue of using the Internet as the source for the reading supplement to the course. He further states that the Internet is indeed a great treasure trove of varied reading comprehension input. Furthermore lack of sufficient vocabulary knowledge is consistently mentioned by students of all levels as the greatest problem they have in order to comprehend texts written in English (Pino-Silva, 1993).

Being aware of this deficiency, teachers, researchers, and material designers have struggled hard to think of methods or approaches to teach vocabulary in the context of reading pedagogy. The fact that sheer exposure to online texts might produce positive results in that direction, even if they were modest, is a strong motif to investigate whether using WebQuest can result in reading improvements and vocabulary achievement. Therefore, in this study the researcher intended to verify whether through Extensive Reading in a learning environment based on a WebQuest the students’ reading comprehension and vocabulary achievement would significantly improve compared to the usual Extensive Reading procedure.

1.3. Statement of the Research Question

This study sought to determine whether there was a significant difference between the Extensive Reading through WebQuest and books in improving the EFL learners’ reading and vocabulary achievement. To achieve this objective, the following research questions were posed:

Q1: Does Extensive Reading through WebQuest have any significant impact on EFL learners’ reading comprehension?

Q2: Does Extensive Reading through WebQuest have any significant impact on EFL learners’ vocabulary achievement?

1.4. Statement of the Research Hypothesis

In order to verify the above research questions, the following null hypotheses were generated:

H₀₁: Extensive Reading through WebQuest does not have any significant impact on EFL learners’ reading comprehension.

H₀₂: Extensive Reading through WebQuest does not have any significant impact on EFL learners’ vocabulary achievement.

1.5. Significance of the Study

English has become the world’s international means for communication or in fact, the world’s lingua franca. In effect, it is safe to say that it is difficult in today’s world to be active and successful in international business, politics, scholarship, or science without considerable competence in English. Levine, Ferenz and Reves (2000) assert that to cope with the competitive edge in the age of technology and information, an effective and efficient reading activity is the key to academic success.

One such effective means is the use of computers and the internet. Azimzadeh and Molaesmaeli (2009: 2) assert that, “Current advances in computer technology, having
access to the internet, and fast pace of change in the communication revolution are affecting the ways foreign language teachers use the information technology to develop the learner’s language skills”. Warschauer (1996) also suggests that research supports the use of electronic technologies in ESL/EFL contexts for the purpose of aiding the students to acquire the linguistics, social, and technological skills needed for successful communication in the age where communication seems to be difficult without resort to such technologies.

WebQuests as electronic technology “exemplify electronic constructivism and incorporate scenarios and tasks that go far beyond fact finding and reporting. When tackling WebQuest challenges, students engage in transformative thinking, combining their innate creativity and curiosity with the vast array of resources on the Internet, to create an original product to demonstrate their new knowledge” (Yoder, 2006: 24).

According to March (1998), WebQuests as inquiry-based activities have several merits such as developing thinking skills, cooperative learning, student motivation, and authenticity. These merits may help learners to improve their reading comprehension and vocabulary achievement. March (1998) maintains that when students are motivated they not only put in more effort, but also their minds are more alert and ready to make connections. He also believes that WebQuests use strategies to increase student motivation by giving students real resources to work with. He finally mentions that, “Rather than turn to a dated textbook, filtered encyclopedias or middle-of-the-road magazines, with the Web students can directly access individual experts, searchable databases, current reporting, and even fringe groups to gather their insights”.

Also, one of the main features of any WebQuest is that students tackle questions that prompt higher level thinking. March (1998) notes that in order to engage students in higher level cognition, WebQuests use scaffolding or prompting which has been shown to facilitate more advanced thinking.

March (1998) also maintains that constructivism suggests that when students need to understand a more complex or sophisticated topic like those that comprise WebQuests, it does not help to serve them simplified truths, boiled down examples, or step-by-step formulas. What they need are many examples with lots of information and opinions on the topic through which they will shift until they have constructed an understanding that not only connects to their own individual prior knowledge, but also builds new schema that will be refined when students encounter the topic again in the future.

Bearing this in mind, WebQuests are the beginning of student use of the Web for learning in general and reading comprehension and vocabulary achievement in particular. Therefore, the findings of this study will have implications for EFL teachers and learners. Through the findings of this study, EFL teachers will learn whether using webQuests is beneficial to the learners’ reading comprehension and vocabulary achievement or not. In case the results of the study support the use of WebQuests, teachers can plan for the appropriate use of WebQuests and provide learners with one source of authentic materials which may in turn prepare the learners for ‘real tasks’. However, in case the findings do not support the use of WebQuests, further research can guide teachers on using other means of computer-mediated communications and CALL tools.

1.4. Limitations and Delimitations of the Study

The limitations posed on the present study were as follows:
In order to effectively evaluate the effects of WebQuest on reading comprehension and vocabulary achievement of the participants it was necessary to have participants with the same computer literacy and the same internet connection speed. Because according to Codone (2001: 3), “user reaction and participation often depends on the level of individual computer literacy”. Also “Internet bandwidth limitations and slow connection speeds sometimes hamper performance”.

However, due to the inconsistent internet speed in the context where the research study was carried out and due to the fact that the participants of the study had different social backgrounds and bearing in mind that the differing social background of the participants often influence their access to technological instruments, the researcher was not able to select participants with the same computer literacy and further instruction of the researcher during the treatment may have not compensated for this inconsistency which may have acted as an intervening variable.

The delimitation of this study includes:

The researcher focused only on intermediate-level students because according to proficiency level description, beginning English language learners have little or no ability to read and understand English used in academic and social contexts. While intermediate English language learners have the ability to read and understand simple, high-frequency English used in routine academic and social contexts. Therefore it is more appropriate for intermediate level to read a short story through WebQuest and follow its instructions. Moreover, advanced learners may have already developed reading comprehension strategies and thus may not be suitable for the purpose of this study.

Also the Extensive Reading which was used in the study was delimited to just a short story. According to Krashen (2000), the students who read literary texts and stories improve more in their vocabulary and reading comprehension. Since the focus of this study was on reading comprehension and vocabulary achievement of the participants, practicing of Extensive Reading was narrowed down to just short story to come to precise results based on the reading comprehension and vocabulary achievement of the participants.

2. Procedure

2.1. Pre-Treatment Stage

To conduct this study, two intact groups at Iranmehr language school were assigned to the researcher. The PET, consisting of three sub-parts; reading, listening, and writing, was used in order to make sure the two groups are homogenous. The test was piloted to a sample group consisting of 30 intermediate EFL learners whose proficiency level was similar to that of the participants of the study. Item analysis was carried out and the reliability coefficient was estimated using Cronbach Alpha.

Writing sub-parts of the students were scored by two raters; the researcher and one of her colleagues. The inter-rater reliability between the two sets of scores was computed. Then the piloted PET was given to 90 intermediate students. After analyzing the scores, 60 students whose scores were one standard deviation above and below the mean were selected and randomly divided into two groups, each containing 30 students.

In order to ensure the homogeneity of the two groups in terms of their proficiency, a $t$-test was run.
2.2. Treatment Stage

The participants attended an eight-week English course for three hours each week. Twenty minutes of every session was allocated to this study. It should be mentioned that the teacher of both groups was the researcher and both groups received the same instruction.

The reading comprehension activities that both groups did in the class included passage reviews, title predictions and alternative endings. In passage review students were asked to read a passage of their choice. After reading, they had to present a review of it to the entire class. Or they may read a passage in their course book and then paraphrase it or write a summary of it. In title predictions before reading out the passage, the teacher read out the title of the passage and encouraged the students to predict what was going to happen and what questions would be answered in the passage. The teacher recorded these on the blackboard and crossed them out when the predictions came true or the questions were answered.

At the end of the passage, the students could discuss as to why some of the predictions did not come true or why some questions were unanswered. Furthermore, the teacher asked the students to come up with alternate endings to the passage that they had read with reasons to justify the proposed ending. This would help the students focus on the story and also use their imaginations to come up with alternate endings.

And for vocabulary students usually made sentences with the new words. Paraphrasing, memorizing synonyms and antonyms, grouping and translation were some of the other vocabulary activities that students usually did in class. In grouping, students grouped words based on the topic, for example, vocabularies related to crime and punishment. In translation, students read a story in a newspaper in Farsi first, and then read the same story in an English newspaper. The two papers were Hamshahri and Iran Daily. Most of the story would probably be the same, so the story in Farsi would help the students to prepare for the reading in English. For example, it would introduce the vocabulary to them, and when they read the English story and there was some vocabulary that they did not know, they could use their knowledge of the story to guess what the new vocabulary meant.

Therefore during these sessions, both groups received instruction; they read and analyzed the same stories, and they practiced the same activities. The only difference was that the experimental group was working on the WebQuest.

2.2. Instruction to the Experimental Group

The researcher created her WebQuest on ZUNAL Sites. ZUNAL, a web-based software, provides a free service for teachers and faculty to create WebQuests and share information online with others. ZUNAL created the structure of the researcher’s WebQuest which included all standard pages (Title Page, Introduction, Tasks, etc., as described in the Instrumentation section) and the researcher was able to edit each page according to the topic she chose.

The teacher introduced the ‘The Tell-Tale Heart’ short story WebQuest and wrote its address (http://zunal.com/webquest.php?w=135285) on the board and explained about its six basic sections that the students needed to use by clicking on the links on the left side of the page. Prior to each session, the students were supposed to read the story...
through the WebQuest at home and then come to the class and explain what they had done, tell about their feelings and the difficulties that they had encountered. Then they started to discuss about the short story worksheets they had downloaded from the internet and had done at home and each session some of the students presented the review of the story in the class.

2.4. Instruction to the Control Group

The participants in the control group read the same story, the Tell-Tale Heart, from the book “24 Great Short Stories” at home and did the same worksheet as the experimental group. And like the students in the experimental group they were supposed to present the review of the story in the class. All the other activities in terms of proceeding through the reading passage and the introduction and practice of the vocabulary were exactly the same as the experimental group.

After the instruction and at the eighth week, both the experimental and the control group students received two posttests, a reading comprehension test and a vocabulary test to determine the effect of practicing Extensive Reading through WebQuest on reading comprehension and vocabulary achievement of the participants.

3. Statistical Analyses

At the onset of the study, the PET was piloted. The reading and listening subtests were scored; the item characteristics including item facility, item discrimination, and choice distribution were analyzed, and then their reliability was computed using Cronbach Alpha.

The writings of the students were scored by two raters, and the inter-rater reliability between the two sets of scores was computed through Pearson product-moment correlation of coefficient after the assumption of normality was checked. The homogeneity of the participants in terms of their proficiency was further assured by running an independent samples t-test.

Then in order to test the research hypotheses, first the descriptive statistics of the reading comprehension and vocabulary posttest were computed and then after checking the assumptions, a MANOVA was run. The results indicated significant difference between the mean scores of the experimental and control groups on the reading comprehension posttest ($F = 6.996$, $p = .01 < .05$, partial Eta squared $= .108$, power $= .739$), leading to the rejection of the first null hypothesis of the study. However, the vocabulary mean scores of the control and experimental groups did not demonstrate a significant difference ($F = .043$, $p = .837 > .05$, partial Eta squared $= .001$, power $= .055$). Therefore, the researcher was not able to reject the second null hypothesis of the study.

Conclusively, the data suggested that practicing Extensive Reading through WebQuest had significant effect on intermediate EFL learners’ reading comprehension, but did not significantly impact their vocabulary achievement.

4. Conclusion
This study investigated whether there was any significant difference between the Extensive Reading through WebQuest and books in improving EFL learners’ reading and vocabulary achievement.

The results of the analysis of the data showed that Extensive Reading through WebQuest had significant impact on EFL learners’ reading comprehension. The findings of this study are in line with those of other studies (e.g., Chun & Plass, 2000; Gruber-Miller & Benton, 2001; Kung & Chuo, 2002; Mosquera, 2001; Osuna & Meskill, 1998; Rico & Vinagre, 2000) which suggest that Web-based language learning (WBLL) has the potential to increase learner motivation and engage learners in culturally authentic and highly interactive language experience which in turn leads to better performance in the target language.

The findings of this study are also in line with those of Son’s (2007: 37), who maintain that through WebQuest learners decide on “the topics, reading materials, and the way they go about exploring the readings themselves. They decide on the process and the product, formulate the goals, identify Internet-based resources, and make a decision on how the outcomes should be evaluated”. Son (2007:37) further claims that, “In this way, the students take on the roles of self-directed and autonomous learners, and take full charge and responsibility for their outcomes”. Therefore, self-directed and more autonomous reading might have been the cause for the significant impact of WebQuest on the reading of the participants of this study.

Moreover, it may have been the case that Extensive Reading through WebQuest entailed more exposure to various reading materials as compared with Extensive Reading through books because learners may have encountered various materials while searching for the ones they intended to read. Thus, through WebQuest more input might have been provided for the learners.

As another justification for the significant finding of this study, one can refer to the fact that WebQuest allows students to explore selected areas in more depth (Jimenez & Lasso, 2008) and thus, more reflective and more critical reading may have resulted.

Another justification for the significant effect of WebQuest on reading could be due to the audiovisual feature available in WebQuest which is often not as much available in printed books. According to Echevarria, Vogt, and Short (as cited in Sox & Rubinstein-Avila, 2009: 41), “The use of illustrations, graphic organizers, trade books, and audiovisual resources provide scaffolding, making the content information more easily accessible for ELLs”. Sox and Rubinstein (2009: 43) assert that n WebQuests “photographs and clip art can be used to build the background knowledge of ELLs”.

However, the data analysis of the study showed that Extensive Reading through WebQuest had no significant impact on EFL learners’ vocabulary achievement. The reason that WebQuest did not have any significant impact on learners’ vocabulary achievement could have been due to the fact that in both control and experimental groups the learners were exposed to vocabulary through Extensive Reading and thus may have followed the same procedure of guessing the meaning from the context or looking up the new words in the dictionary.

In other words, through WebQuest, like any other Extensive Reading, language learners learned to get the message of the text and comprehend the meaning of the whole passage rather than focusing on single words. This indicates a more holistic approach toward comprehension rather than a micro focus on the form of the language, like vocabulary and grammar, while reading.

Moreover, in a study by Sox and Rubinstein-Avila (2009), in which they investigated the standard quality of eight WebQuests for secondary students for whom English was
an additional language, they designed a rubric to assess the appropriacy of WebQuests in terms of three main features: linguistic, multimedia, and organizational. They found out that there were serious concerns for these three features of Webquests and their appropriacy for meeting the needs of ELLs. Therefore, they made certain suggestions such as: providing first language support such as bilingual dictionaries, carefully placing visuals to enhance comprehension of the instructions and key vocabularies, highlighting content vocabulary and essential words, and providing graphic organizers for note-taking and planning the final product in order to improve comprehension of ELLs.

Therefore, the reason WebQuest did not result in significant vocabulary achievement of the participants of this study may have been due to the specific features of the WebQuest used in this study. The WebQuests used in this study had audiovisual features that were related to the general idea or the topic of the reading but not to the new vocabularies; the new vocabularies were highlighted in all WebQuests, but only in some of them the meaning would be shown with a click of the mouse; the dictionaries available were monolingual and not bilingual; and finally no graphic organizers were available. Therefore, the findings of this study in terms of its impact on vocabulary achievement must be generalized with caution.

Therefore, it could be concluded that the use of WebQuests can have significant impact on EFL learners’ reading comprehension, but for an equivalent impact in terms of vocabulary achievement, certain features of the WebQuest have to be taken into consideration and need to be assessed for determining its effectiveness and appropriacy.

5. Pedagogical Implications

The findings regarding the significant effect of the treatment on reading comprehension support the finding of other study. Tsai (2006) identified a connection between WebQuests and the ability of students to identify contextual clues and main ideas in readings within the context of English as a Foreign Language.

Also the researcher directly observed more enjoyment and higher degree of motivation among the learners who read the story through WebQuest. Therefore, practical implications can be considered for the findings of this study. The main implication of this study would be directed to language teachers, students, teacher educators, syllabus designers, and curriculum developers to consider WebQuest as one of the effective strategies in EFL environment, particularly in relation to reading comprehension.

5.1. Implications for EFL Teachers

Most English language learners often say that reading, which is a vital element of language learning, is boring and difficult. Wigfield (1997) noted that intrinsic reading motivation, consisting of curiosity in learning about a particular topic of interest, the pleasure gained from being engaged in reading interesting materials and the challenge in learning complex or difficult ideas are important components in turning students into proficient readers. Thus, the finding of this study could be of immediate interest to language teachers to make reading more enjoyable and engage learners in the process of reading more effectively through WebQuest.
The use of technology in teaching and learning can help bring reading alive for learners. Web-based inquiry learning environment (WebQuest) can facilitate the reading experience and help students meet challenging standards while addressing essential questions that bring meaning to learning. Through the use of WebQuests, students engage in problem solving, information processing, and collaboration.

Undoubtedly, the strategies that teachers employ have important roles in their learners’ achievement, thus their efforts to explore different sources for teaching are of great significance. It can be concluded form this study is that practicing Extensive Reading through WebQuest increases student reading comprehension. As a result, it may be insightful for EFL teachers to embrace WebQuest for reading short stories in order to supplement the reading comprehension of learners.

WebQuest design and implementation workshops should be attended by teachers in order to be able to properly incorporate WebQuest into their instruction. There are several websites that are specifically geared towards creating webquests. Questgarden, Zunal, and Teacherweb all allow teachers to create accounts and walk them through the process of creating a WebQuest. In addition to the WebQuest design training, WebQuest facilitation training should be presented to teachers.

In EFL instructions, teachers should understand learner difficulties, such as L2 reading issues and non-linear reading problems. Therefore, the researcher highly recommends the teachers to integrate WebQuests into their teaching as it seems they are “excellent instructional tools for promoting critical thinking skills, scaffolding, and cooperative learning” (Zheng, Stucky, McAlack, Menchanna & Stoddart 2005).

5.2. Implications for EFL Learners

Another group who can benefit from the findings of this study is EFL learners. One of the strong points of WebQuest instruction as the researcher directly observed is that WebQuest increases student motivation. When students are motivated, they are likely to put in more effort, and their minds are more alert and ready to make connections. Several aspects of WebQuests contribute to increasing student motivation. Many WebQuest tasks are designed to address problems or issues that exist in the real world which make the task authentic. In WebQuests, students use real and timely resources such as websites and online resources.

The WebQuest itself provides structure to the investigation of the authentic topic, thereby increasing the ability of students to successfully navigate a highly unstructured environment such as the Internet. Also, WebQuests prompt higher-level thinking. The questions posed to students require more than just finding and spitting back information. They must take the information they research and transform it into something else. Students then develop a product which then demonstrates their knowledge of the problem and its potential solutions.

Therefore, WebQuest is also oriented toward task-based language teaching in which the outcome of the task is the main objective to achieve and is thus, a technological tool which is very much in line with the developments in English language learning and teaching.

5.3. Implications for Teacher Educators
Webquests are learner motivational web-based teaching methodologies that are advantageous for both EFL teachers and learners, so it would be beneficial to incorporate WebQuest into EFL teaching and learning programs.

In doing so, the teachers educators can play important roles. WebQuests are an implementation of technology that teachers consider as an up-to-date strategy that provides knowledge for students in an interesting manner (Vidoni & Maddux, 2002). Therefore, integrating new strategies into teaching methods, such as WebQuest with specific feature can be emphasized by teacher educators in teacher training courses for novice teachers as well as during workshops for in-service-teachers. Besides informing teachers about the significance of WebQuest, they can provide teachers with clear and comprehensive procedures of creating WebQuest, so that there would be a kind of unity among teachers’ methodology in each language school.

5.4. Implications for Curriculum Developers and Syllabus Designers

Since the beneficial effects of WebQuest in reading comprehension have been reassured by the present study, the curriculum developers and syllabus designers can incorporate WebQuest strategy to the existing curriculum and develop a collection of appropriate WebQuest for curricular use. Integrating WebQuest into the curriculum involves infusing the necessary components to extend and enrich the existing course curriculum.

6. Suggestions for Further Research

This study attempted to investigate the effect of practicing Extensive Reading through Web-Based Inquiry learning Environment (WebQuest) on Intermediate EFL Learners’ reading comprehension and vocabulary achievement. Several possible directions have emerged from this study with the hope that they inspire other researchers who decide to conduct studies in this area in future:

1. The results of this study suggest that WebQuest is a favorable tool for reading comprehension. Therefore, the researcher suggests further investigation into the effect of WebQuests on EFL learners’ critical reading.

2. However, as the results of this study did not turn out to be significant for vocabulary achievement, the researcher recommends additional research into the effectiveness of WebQuests in relation to vocabulary achievement. This implies investigating and identifying WebQuest features that could signify effectiveness in relation to vocabulary achievement.

3. Furthermore, research on the actual educational benefits of WebQuests is lacking. Although there seems to be an abundance of descriptive writing related to WebQuests, the literature is quite sparse when searching for research findings. Empirical studies are needed to further explore the role that WebQuests can play in EFL instruction, particularly the main four language skills.

4. In addition, the effect of WebQuest should be evaluated using other disciplines and age groups and in a variety of learning environments to determine its effects on student’s learning.
5. There is enough support to encourage further studies on the use of WebQuests in teacher preparation programs.

6. This study was quantitative, but the researcher suggests a more in-depth analysis of students’ and teachers’ attitudes toward WebQuest and their perceptions of its efficacy. Research should include exploration of the roles teachers and learners play in an advantageous use of WebQuests and how they interact through this technology by using both observation data and attitudinal survey methods. Also, a qualitative research with observations is needed to further investigate the students’ learning process during a WebQuest instruction and determine language learners’ concerns and problems both in terms of language learning and technological difficulties.

7. Most of today’s students are not sufficiently exposed to resourced-based learning, and thus, may not be prepared to understand this type of learning (MacGregor & Lou, 2004). Further research is necessary to explore what types of scaffolds are beneficial for learners completing a WebQuest. Also, an interactive feedback facility embedded in a WebQuest instruction could be used to determine if there is a correlation between the frequency of using the feedback mechanism and the students’ achievement.

6. References


The Dynamic Nature of Autonomy in Foreign Language Learning

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Abstract. The study reported in this paper examined the changing character of autonomy in foreign language grammar learning by tracing its fluctuations over the period of several weeks and during the course of several classes. The study also investigated the impact of the use of online resources and a browser-based virtual world on the development of autonomy in comparison with instruction based on conventional materials. 27 senior high school students participated in the research project. They were divided into two groups: the experimental group (n=13) and the control group (n=14). The data were collected by means of grammar autonomy questionnaire administered before and after the treatment as well as autonomy self-evaluation sheet completed by the subjects after several lessons. The data were subjected to quantitative analysis. The results show that the study participants’ levels of autonomy were indeed subject to change. Furthermore, the results demonstrate that the experimental learners manifested greater independence in learning immediately after the intervention and one month later, while at the same time the control students reported lower levels of autonomy.

Keywords: autonomy in foreign language learning, autonomous changes, learning grammar, Internet resources, browser-based virtual worlds

1. Introduction

According to Benson (2001: 183), almost all research in the field of autonomy is based on and has implications for the following three hypotheses: (1) the concept of autonomy is based on a natural tendency for learners to take control over their learning, i.e. autonomy is available to all students, even though it is displayed in different ways and to different degrees in relation to the typical features of both each student and learning situation, (2) students who lack autonomy are able to develop it provided they are given appropriate conditions (i.e. opportunity to exercise control over learning) and preparation, and (3) autonomous learning is more effective than non-autonomous learning i.e. the development of autonomy implies better language learning. Numerous empirical investigations of autonomy in language learning have been conducted in many parts of the world in recent years. They aimed to diagnose the level of autonomy in various educational settings (e.g. Pawlak 2008a; Strzalka & Żdziebło 2008; Siek-Piskozub & Strugielska 2008), attempted to compare the relationship between the development of learner autonomy and language achievement (e.g. Dam & Legenhausen 1996; Daifei 2007; Mystkowska-Wiertelak 2008; Kruk 2012a), investigated the way learner autonomy might be developed (e.g. Sert 2006; Balçikani 2008; Pawlak 2008b; Andrzejewska 2011) or explored the use of computer technology in the development of learner autonomy (e.g. Kruk 2011; Skweres 2011; Kruk 2012b; Wach 2012). It is unfortunate, however, that most of the research projects have failed to take into consideration the dynamic character of autonomy in language learning, as reflected in its variation over extended periods of time as well as over sequences of lessons. The present paper is an attempt to partly rectify this problem by reporting the findings of a study whose purpose was to investigate changes in autonomous behavior of Polish senior high schools students over time. Furthermore, the study sought to investigate the impact of using a combination of Internet resources with a browser-based virtual world on the development of autonomy in comparison with traditional instruction based on conventional materials.
2. Models of learner autonomy

The literature offers several models of learner autonomy in language learning in which researchers present it as a succession from lower to higher level. In one such model, Littlewood (1996: 430-431) describes three components and domains of autonomy, such as autonomy as communicators, autonomy as learners and autonomy as persons and suggests that there are different levels of autonomy in each domain. Thus, according to the researcher, autonomy as a communicator depends on the ability to use the target language creatively as well as the ability to use appropriate strategies for communicating meanings in specific situations. As for autonomy as a learner, it includes the ability to engage in independent work (e.g. self-directed learning) and the ability to use appropriate learning strategies both inside and outside the classroom. When it comes to autonomy as a person in the foreign language learning context, it depends on the ability to express personal meanings and the ability to create personal learning contexts, for example, through interacting outside the classroom.

In another attempt to model levels of learner autonomy Littlewood (1997: 81) distinguishes language acquisition, learning approach and personal development. As regards language acquisition, autonomy in this model entails “an ability to operate independently with the language and use it to communicate personal meanings in real, unpredictable situations.” In the next stage, autonomy is viewed as “an ability to take responsibility for their own (students’) learning and to apply active, personally relevant strategies.” As far as the last context is concerned, autonomy is related to personal development in which it comprises a goal of “greater generalized autonomy as individuals.” It should be noted that in this model of autonomy the dimensions of language acquisition, learning approach and personal development correspond to the domains of autonomy as a communicator, a learner and a person presented in the model described above.

Nunan (1997: 195), in turn, sets out a scheme in which he proposes five levels for encouraging learner autonomy. In this model of learner autonomy, the levels of student action involve such issues as awareness, involvement, intervention, creation and transcendence, each of which entails measurements of content and process. In terms of content, the first step along the autonomy continuum is to make students aware of the purpose and content of the curriculum or pedagogical materials. The second step is to engage learners in choosing goals and content from a variety of alternatives presented to them. Further along the path towards autonomy, learners may modify and adapt goals and content. The next level is to involve students in creating their own goals and content so as to function as fully autonomous learners at the final level. In the terms of process, learners identify their own preferred learning styles or strategies (level 1) and make choices among a variety of options (level 2). Next, students modify or adapt tasks (level 3) in order to create their own ones (level 4). Finally, learners become teachers and researchers (level 5).

Yet another interpretation of levels of learner autonomy is presented by Littlewood (1999: 75) who promotes the concept of two types of autonomy, that is, proactive and reactive. As far as proactive autonomy is concerned, it describes learners who are in charge of their own learning, select learning methods and techniques, set their learning goals and eventually self-assess their language performance. When it comes to reactive autonomy, Littlewood states that it “is the kind of autonomy which does not create its own direction but, once a direction has been initiated, enables learners to organize their resources autonomously in order to reach their goal” (1999: 75). In this case, students work on their own, organize groups and collaborate. Moreover, Littlewood argues that, although for a number of researchers it is proactive autonomy that matters in language education, reactive autonomy can be viewed as a goal in its own and probably a possible transition to proactive autonomy.
Sharle and Szabó (2000: 1) offer a model of learner autonomy that consists of several levels of autonomy development. The researchers categorize various activities aimed at developing learner autonomy into three sections representing three phases of the developmental process that involved raising awareness, changing attitudes and transferring roles. When it comes to the first phase, it is devoted to assisting students in “becom[ing] aware of the differences their contributions can make, and of the nature of language learning in general” (2000: 1). As regards the second and third phases, students will “need some well-structured practice in their new attitudes as responsible learners” (phase two) in order to “be ready to take over some roles from the teacher and enjoy the freedom that comes with increased responsibility” (phase three). It could be argued that such an approach to the development of autonomy allow teachers to develop autonomy gradually and within regular school hours.

Benson’s model (2001) of learner autonomy entails dimensions of control over language learning and teaching processes that can be designated as control over learning management, control over cognitive processes and control over learning content (2001: 76-103). According to the researcher, the first dimension, i.e. the control over learning management, can be best explained with respect to “the behaviours that learners employ in order to manage the planning, organisation and evaluation of their learning” (2001: 76). More precisely, learners are assisted in discovering and evaluating strategies that they use in a learning task as well as being encouraged to explore strategies that they have never tried out before. As for the second dimension, i.e. the control over cognitive processes, Benson claims that it can be “understood as a matter of the psychology of learning rather than as directly observable learning behaviours, although it will generally be inferred from the observation of these behaviours. It is also less concerned with general attitudes towards learning than with particular mental processes associated with the idea of control” (2001: 87). Moreover, the researcher makes an attempt to describe the control over the cognitive processes engaged in language learning with regard to attention, reflection and metacognitive knowledge. When it comes to the last dimension, i.e. the control over learning content, it is part of self-management which, like other aspects of learning management, is based on the control over cognitive processes. According to Benson, control over content is crucial to autonomy, since “if learners are self-managing methodological aspects of the learning process, but not learning what they want to learn, their learning may not be authentically self-directed” (2001: 99). Furthermore, in institutional contexts, learner control over content has social and political aspects, which means, that students “may have to learn how to exercise control over the collective situation of their learning, using capacities for social interaction that are distinct from those required in the management of individual learning” (2001: 99).

Last but not least, Tassinari (2012: 28) presents a dynamic model of learner autonomy in which learner autonomy is viewed as a complex construct or a construct of constructs encompassing various components such as cognitive, metacognitive, affective, motivational, action-oriented and social. The model encapsulates these components with regards to learners’ competencies, skills, choices and decision-making processes as well as determines their reciprocal relationships. The components of this dynamic model of learner autonomy are domains of competencies, skills and actions with no hierarchy among them. According to Tassinari, the model is both structurally and functionally dynamic, i.e. “it is structurally dynamic, because each component is directly related to all the others […] it is functionally dynamic, because learners can decide to enter the model from any component and move freely from one component to another without following a given path, according to their needs and purposes” (2012: 29).

As can be seen from the above, several competing models of learner autonomy have been proposed which present a trend in the literature on the development of autonomy as a gradual and
dynamic process. These different models of learner autonomy show that the concept of autonomy is a very complex one, which makes it difficult to introduce it into language instruction straight away. Moreover, it has to be remembered that language learners display various levels of autonomous behaviors, including those making up the same class, and that the effort of promoting autonomy simply takes time. Finally, in some educational contexts, such as the Polish one, in which foreign language instruction is frequently limited to two or three classes per week as well as students’ diversity in terms of language proficiency within a single class, such models of learner autonomy present at least an opportunity to promote autonomy, beginning with elementary schools and continuing up into university or college levels.

3. The study

3.1. Aims of the study

The study aimed at investigating the changing nature of autonomy in foreign language grammar learning by tracing its changes over the period of several weeks and its variations from one lesson to another. Another purpose of the study was to examine the impact of using a combination of online resources with a browser-based virtual world on the development of autonomy in learning the past simple tense in comparison with instruction based on conventional materials.

3.2. Participants

The subjects were 27 third grade students of Polish senior high school. They were randomly divided into two groups in accordance with the policy of the school which divides a class of more than 25 students into groups for foreign language lessons. Thus, the experimental group (ExG) consisted of 13 subjects and the control group (CG) comprised 14 learners. The students in each group had three hours of English a week and they were taught by two English teachers – the present author and his colleague. The analysis of the responses to the background questionnaire revealed that, on average, the experimental students had been learning English for 8.46 years and the learners in the control group for 8.50 years. When it comes to the subjects’ self-assessment, it turned out to be slightly higher in ExG than in CG and amounted to 2.77 and 2.50, respectively. All subjects stated that learning new vocabulary and reading were the most favorite things to learn, while grammar was considered to be the most difficult subsystem for them to study. Only one member of the experimental group and one student in the control group admitted to receiving any type of outside exposure, but it was rather insignificant as the majority of them only listened to English music, occasionally watched movies with the Polish subtitles and read some Internet sites. These facts were welcomed by the present author as this meant that the likelihood of out-of-class exposure unduly affecting the outcomes of the study were minimal.

3.3. Treatment

The first lesson in the experimental group began with the students searching the Internet, using web pages to find information related to the past simple tense and taking notes on the use of the
past simple tense. The second half of the class was devoted to online grammar practice. The learners were provided with links to several websites containing a variety of exercises on the item in question (e.g. http://www.ego4u.com/en/cram-up/grammar/simple-past#exercises or http://perso.wanadoo.es/autoenglish/gr.pastsim.i.htm) and asked to perform several activities of their own choice. The activities were of the following types: writing sentences with the use of given words, answering questions, rewriting sentences, filling the gaps, matching and asking about the underlined part of the sentence. When it comes to the second lesson, it started with further grammar practice by means of the above-mentioned websites and activities. After approximately twenty minutes, the experimental subjects were requested to log on to the browser-based virtual world Yoowalk (http://www.yoowalk.com/) in order to talk with its virtual residents using the grammar structure. As for the last lesson, it was in its entirety conducted in the virtual world. This time however, the learners pretended to be journalist working for a local newspaper. Their task was to collect information and write a short note concerning the residents of Yoowalk past activities.

When it comes to the control group, the first lesson started with the teacher’s presentation related to the past simple tense. The remaining part of this class was devoted to doing a series of exercises from the coursebook of the following kind: completing sentences with the verbs in the correct form and rewriting sentences. The second lesson began with a simple gap filling exercise. During the next activity, the teacher asked each student questions which required them to provide short answers. This activity was followed by a similar task; however, this time the answers to the teachers’ questions were to be answered in full sentences. The lesson finished with the students asking and answering various types of questions. It has to be added that all activities were controlled by the teacher who always corrected the students’ mistakes and provided feedback. As regards the third lesson, it commenced with a short exercise in which the students were requested to write sentences from words in brackets. The activity was again checked by the teacher who nominated several students to read and then write the correct sentences on the board. During the third lesson the students in the control group performed an activity similar to that in the experimental group. Here however, the learners were asked to work in pairs, impersonate journalists of a local newspaper and interview citizens of an imagined local town in order to obtain information needed to write a short note on their interlocutors’ past activities.

3.4. Data collection tools, procedures and analysis

The data were collected by means of a background questionnaire, grammar autonomy questionnaire (GAQ) and autonomy self-evaluation sheet (ASES). Prior to the study, these instruments were piloted with a comparable group of senior high school students and some modifications were introduced. It should also be noted that the tools were designed and presented to the students in Polish so as to avoid any potential misunderstandings. All the questionnaires were filled in by the study participants before and after the treatment. The research schedule is given in Table 1.

<table>
<thead>
<tr>
<th>Time</th>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>Background questionnaire, grammar autonomy questionnaire (GAQ1)</td>
</tr>
<tr>
<td>Lesson 1</td>
<td>Autonomy self-evaluation sheet (ASES1)</td>
</tr>
</tbody>
</table>
Lesson 2  Autonomy self-evaluation sheet (ASES2)
Lesson 3  Autonomy self-evaluation sheet (ASES3)
Week 3  Grammar autonomy questionnaire (GAQ2)
Week 7  Grammar autonomy questionnaire (GAQ3)

The background questionnaire aimed at providing such information as the learners’ personal history of foreign language learning, the amount of out-of-school exposure, attitudes or motivation. The data obtained by means of the background questionnaire involved quantitative and qualitative analysis and sometimes both ways of analyzing the data were utilized. As regards GAQ, it was created by focusing on the aspects mentioned in similar questionnaires available in the literature (e.g. Pawlak 2008b, Czura 2010, Kruk 2010). Its purpose was to measure the students’ autonomy in learning English grammar before and after intervention. The tool contained 28 items and was designed in the form of Likert-scale statements ranging from 1 (‘the statement does not describe me at all’) to 5 (‘the statement describes me very well’). In addition, GAQ comprised seven categories which included: (1) the ability to select and implement relevant resources, (2) collaboration with other students, (3) the ability to establish learning aims and objectives, (4) engagement in outside classroom learning, (5) the ability to evaluate own grammar, (6) the capability to implement appropriate strategies in learning grammar and (7) the role of the teacher and the role of the learner in grammar instruction and learning. The reliability estimate for the questionnaire was established on the basis of the results obtained before, immediately after the treatment and after four weeks by means of Cronbach alpha. The tool has been shown to be both reliable and valid each time it was administered, with the lowest alpha coefficient of .78 and the highest of .91 (the average amounted to .87). As far as ASES is concerned, the questionnaire contained 6 Likert-scale items (e.g. “During the lesson I did exercises which were appropriate to my level of grammar proficiency”, “I was able to evaluate myself” or “After today’s lesson I know what I should work on more”) where 1 indicated disagreement and 5 agreement. Also in this case, the reliability of the instrument was acceptable as the average of Cronbach’s alpha amounted to 0.72.

It should be noted that the statistical analyses also involved tabulating the means and standard deviations for all data collection tools (McKay, 2006: 44). The levels of statistical significance were established by means of the paired-samples t-tests and independent-samples t-tests. The first test was employed to assess the changes within one group and the second was used when the experimental and control groups were compared. The tests were conducted by means of the Statistical Package for the Social Sciences (SPSS version 19 for Windows). The significance value was set at \( p \leq 0.05 \) for all analyses.

4. Results

Table 2 shows the means, standard deviations and statistical analysis of grammar autonomy questionnaires for the experimental group and control group. The means the groups achieved on these questionnaires are also plotted in Figure 1 for easier comparisons. Since there were some intergroup differences between GAQ1 means, independent samples 2-tailed t-test was run; however no significant difference was found \( (p > 0.05) \). This result meant that any observed changes in autonomous behavior were due to treatment and not due to initial differences between

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1The interpretations of the values of Cronbach alpha are based on Larson-Hall (2010: 171).
The two groups. Furthermore, the data revealed that ExG displayed higher levels of autonomy on GAQ2 when compared with CG (the difference of 0.44 of a point) and the difference turned out to be of statistical significance. As for GAQ3, the data showed that both groups manifested less autonomy in comparison with GAQ2, with the difference between the groups amounting to 0.40. Also this time, this difference reached statistical significance (see Table 2).

Table 2. Means, standard deviations and statistical analysis of GAQs for the experimental and control groups.

<table>
<thead>
<tr>
<th>GAQ</th>
<th>ExG</th>
<th>M (SD)</th>
<th>CG</th>
<th>M (SD)</th>
<th>Statistical analysis (2-tailed t-tests)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GAQ1</td>
<td>3.24</td>
<td>1.06</td>
<td>3.11</td>
<td>1.11</td>
<td>t(54)=0.912, p=.366</td>
</tr>
<tr>
<td>GAQ2</td>
<td>3.51</td>
<td>0.85</td>
<td>3.07</td>
<td>1.09</td>
<td>t(54)=3.299, p=.002*</td>
</tr>
<tr>
<td>GAQ3</td>
<td>3.41</td>
<td>0.79</td>
<td>3.01</td>
<td>1.06</td>
<td>t(54)=3.199, p=.002*</td>
</tr>
</tbody>
</table>

Figure 1. Means for the experimental and control groups on GAQs.

When it comes to the experimental group, their autonomy increased from GAQ1 to GAQ2 by 0.27 of a point, while at the same time the degree of autonomy in the control group dropped by 0.04. However, the results of GAQ3 revealed that then the level of autonomy in ExG and CG decreased by 0.10 and 0.06, respectively. In the long run, between the first and the last administration of GAQ, ExG reported more autonomy (the difference of 0.17), while the subjects in the control group became even less autonomous than before the study (the difference of 0.10). It has to be added that all the differences in the means of the experimental group reached statistical significance (see Table 2).

We can, therefore, conclude that the treatment with the application of online resources and the browser-based virtual world resulted in statistically significant growth in the level of autonomy in
ExG after the treatment. What is also clear from the above is that the decrease in autonomy for ExG did not hold over the time frame of the present study, as revealed by the significant differences between GAQ2 and GAQ3 in that group. It should also be added that there were no statistically significant differences over time in the levels of autonomy in the control group, and that the control students continued to become less autonomous. It may be therefore concluded that the traditional type of treatment did not have a positive effect on fostering autonomy among students in the control group.

The results of GAQ with respect to categories are presented in Table 3. These data show that the members of ExG manifested more autonomous behavior in all categories from GAQ1 to GAQ2 and from GAQ1 to GAQ3. On the other hand, their autonomy decreased in almost all categories from GAQ2 to GAQ3 except category 2. A much more complicated picture emerges in the case of CG since the subjects’ declared level of autonomy increased from GAQ1 to GAQ2 in three categories (i.e. 3, 4 and 6) and at the same time it decreased in four ones (i.e. 1, 2, 5 and 7). When it comes to the changes in the control learners’ autonomy from GAQ2 to GAQ3 and GAQ1 to GAQ3, it rose in two areas (i.e. 2 and 3) and dropped in five (i.e. 1, 4, 5, 6 and 7). It has to be noted, however, that the changes in the degree of autonomy were minute and only some of the within-group differences turned out to be statistically significant or near-significant, as shown in the bottom rows of Table 3. In particular, the experimental subjects reported significantly better engagement in outside classroom learning (category 4) from GAQ1 to GAQ2 (the difference of 0.19) and also declared significantly greater role of the learner in grammar learning (category 7) from GAQ1 to GAQ2 (the difference of 0.32). What is more, category 3 (i.e. the ability to establish learning aims and objectives) approached statistical significance, with the difference of 0.32 of a point. When it comes to the control group, no statistically significant differences were found and only one category (i.e. 6) from GAQ2 to GAQ3 turned out to be of near-significance. However, the subjects in that group declared to be less able to implement appropriate grammar strategies (the difference of 0.16).

<table>
<thead>
<tr>
<th>Category</th>
<th>ExG M (SD)</th>
<th>CG M (SD)</th>
<th>Statistical analysis (2-tailed t-tests)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GAQ1</td>
<td>3.33 (1.08)</td>
<td>2.96 (1.16)</td>
<td>t(6)=0.874, p=.416</td>
</tr>
<tr>
<td>GAQ2</td>
<td>3.44 (0.82)</td>
<td>2.93 (1.05)</td>
<td>t(6)=1.725, p=.135</td>
</tr>
<tr>
<td>GAQ3</td>
<td>3.38 (0.84)</td>
<td>2.87 (1.10)</td>
<td>t(6)=5.893, p=.132</td>
</tr>
<tr>
<td>GAQ1</td>
<td>3.12 (1.10)</td>
<td>3.13 (1.24)</td>
<td>t(6)=-0.026, p=.980</td>
</tr>
<tr>
<td>GAQ2</td>
<td>3.35 (0.93)</td>
<td>3.07 (1.02)</td>
<td>t(6)=0.631, p=.551</td>
</tr>
<tr>
<td>GAQ3</td>
<td>3.37 (0.92)</td>
<td>3.20 (1.09)</td>
<td>t(6)=0.401, p=.702</td>
</tr>
<tr>
<td>GAQ1</td>
<td>2.83 (1.05)</td>
<td>2.68 (1.07)</td>
<td>t(6)=-0.625, p=.555</td>
</tr>
<tr>
<td>GAQ2</td>
<td>3.15 (0.97)</td>
<td>2.80 (1.11)</td>
<td>t(6)=1.203, p=.274</td>
</tr>
<tr>
<td>GAQ3</td>
<td>2.90 (0.69)</td>
<td>2.93 (0.97)</td>
<td>t(6)=-0.080, p=.939</td>
</tr>
<tr>
<td>GAQ1</td>
<td>3.00 (1.19)</td>
<td>2.95 (1.12)</td>
<td>t(6)=-0.094, p=.928</td>
</tr>
<tr>
<td>GAQ2</td>
<td>3.19 (0.83)</td>
<td>3.04 (1.09)</td>
<td>t(6)=0.303, p=.772</td>
</tr>
<tr>
<td>GAQ3</td>
<td>3.15 (0.73)</td>
<td>2.80 (1.08)</td>
<td>t(6)=-0.765, p=.473</td>
</tr>
<tr>
<td>GAQ1</td>
<td>3.63 (0.99)</td>
<td>3.59 (0.92)</td>
<td>t(6)=-0.222, p=.832</td>
</tr>
</tbody>
</table>

To further explore the effects of the two kinds of treatment on the subjects’ level of autonomy, a series of independent samples 2-tailed *t*-tests were run on the results and some of the inter-group differences proved to be statistically significant as shown in the right hand column of Table 3. In particular, the responses for category 5 indicate that the members of ExG were able to evaluate their own grammar significantly better than their control counterparts on GAQ 2 and GAQ3, with the difference of 0.55 and 0.71, respectively. A statistically significant difference existed also between the two groups in the subjects’ perception of the role of the teacher and the role of the learner in grammar instruction and learning (category 7) on GAQ 2 and GAQ3, with the difference of 1.15 and 1.13, respectively.

Table 4 and Figure 2 show the participants of the study level of autonomy after each of the three lessons measured by ASES. These data show that the experimental students declared a steady and quite high level of autonomy over the course of the three classes, while the changes in the control group were somewhat more dynamic. Here the reported autonomy in CG first dropped by 0.12 from lesson 1 to lesson 2 and then increased quite dramatically by 0.46 from class 2 to class 3. When such fluctuations are juxtaposed with the lessons plans, it turns out that during the first two classes the control students worked under strict supervision of the teacher. It could be argued that the increase observed after the third lesson might have been the result of a pair-work activity and a writing exercise in which the students were allowed more freedom in learning.

<table>
<thead>
<tr>
<th>GAQ2</th>
<th>3.98 (0.79)</th>
<th>3.41 (1.04)</th>
<th><em>t</em>(6)=4.411, <em>p</em>=.005*</th>
</tr>
</thead>
<tbody>
<tr>
<td>GAQ3</td>
<td>3.85 (0.72)</td>
<td>3.23 (1.07)</td>
<td><em>t</em>(6)=3.796, <em>p</em>=.009*</td>
</tr>
<tr>
<td>GAQ1</td>
<td>3.19 (1.00)</td>
<td>3.18 (1.22)</td>
<td><em>t</em>(6)=0.030, <em>p</em>=.977</td>
</tr>
<tr>
<td>6</td>
<td>GAQ2</td>
<td>3.48 (0.90)</td>
<td>3.25 (1.13)</td>
</tr>
<tr>
<td>GAQ3</td>
<td>3.44 (0.90)</td>
<td>3.09 (1.11)</td>
<td><em>t</em>(6)=0.729, <em>p</em>=.312</td>
</tr>
<tr>
<td>GAQ1</td>
<td>3.62 (0.98)</td>
<td>3.27 (1.05)</td>
<td><em>t</em>(6)=0.812, <em>p</em>=.448</td>
</tr>
<tr>
<td>7</td>
<td>GAQ2</td>
<td>3.94 (0.73)</td>
<td>3.00 (1.15)</td>
</tr>
<tr>
<td>GAQ3</td>
<td>3.77 (0.73)</td>
<td>2.93 (1.01)</td>
<td><em>t</em>(6)=3.460, <em>p</em>=.013*</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Statistical analysis (two-tailed paired <em>t</em>-test)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GAQ1→GAQ2</td>
</tr>
<tr>
<td>GAQ2→GAQ3</td>
</tr>
<tr>
<td>GAQ1→GAQ3</td>
</tr>
<tr>
<td>GAQ1→GAQ2</td>
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<tr>
<td>GAQ2→GAQ3</td>
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<tr>
<td>GAQ1→GAQ3</td>
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<td>GAQ1→GAQ2</td>
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<td>GAQ2→GAQ3</td>
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<td>GAQ1→GAQ3</td>
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<td>GAQ2→GAQ3</td>
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<tr>
<td>GAQ1→GAQ3</td>
</tr>
</tbody>
</table>
the target language. It is also interesting to note that the changes in the levels of autonomy declared by the students in the control group reached statistical significance from ASES2 to ASES3 and from ASES1 to ASES3 (see Table 4). When it comes to the differences between ExG and CG, the two groups differed significantly on ASES1 and ASES2, with the difference of 0.77 and 0.86, respectively.

![Figure 2. Means for the experimental and control groups on ASES.](image)

**Table 4. Means, standard deviations and statistical analysis of ASES for the experimental and control groups.**

<table>
<thead>
<tr>
<th></th>
<th>ExG</th>
<th>CG</th>
<th>Statistical analysis (two-tailed t-tests)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASES1</td>
<td>4.24 (0.55)</td>
<td>3.47 (0.24)</td>
<td><em>t</em>(10)=3.137, <em>p</em>=.011*</td>
</tr>
<tr>
<td>ASES2</td>
<td>4.21 (0.38)</td>
<td>3.35 (0.52)</td>
<td><em>t</em>(10)=3.230, <em>p</em>=.009*</td>
</tr>
<tr>
<td>ASES3</td>
<td>4.24 (0.37)</td>
<td>3.81 (0.32)</td>
<td><em>t</em>(10)=2.121, <em>p</em>=.060</td>
</tr>
</tbody>
</table>

...It should also be pointed out that by and large the values of the standard deviation decreased from GAQ1 to GAQ3 in the experimental group when it comes to the overall results of the grammar autonomy questionnaire and its categories as well as ASES (see Tables 2, 3 and 4). However, the control group’s standard deviations were more susceptible to change and generally higher than those in the experimental group. This means that the treatment employed in the experimental group leveled out the differences between the subjects’ autonomy, while the traditional treatment increased them and made the control learners more diverse.
5. Discussion

The results of the study demonstrate that the levels of autonomy changed over time in both the experimental group and the control one. It should be noted, however, that such fluctuations were more pronounced in the case of the experimental learners when it comes to the overall results of the grammar autonomy questionnaire. On the other hand, the overall degree of autonomy in the control group remained approximately on the same level throughout the study, although it kept decreasing from GAQ1 to GAQ3. By contrast, the results of the autonomy self-evaluation sheet showed that the level of autonomy remained almost the same at different points in time in the experimental group. At the same time, the control subjects manifested various levels of autonomy from lesson to lesson. It is also interesting to note that the changing character of autonomy was found in various categories related to GAQ. Here, again, the most visible fluctuations in autonomous behavior were observed among the members of the control group. Such findings provide evidence that fostering learner autonomy leads to changes in autonomous behavior over longer periods of time and is less amenable to modifications over shorter periods (i.e. from class to class). On the contrary, traditional or teacher centered instruction, results in greater fluctuations in the level of autonomy in the course of single lessons and does not change substantially over longer periods of time, ultimately preventing language learners from becoming autonomous.

The analysis of the data obtained by means of GAQ demonstrated that the experimental group became more autonomous after the treatment when compared with the control group, whose level of autonomy kept decreasing from GAQ1 to GAQ3. What is more, the differences between the two groups reached statistical significance on GAQ2 and GAQ3. The favorable effects of instruction based on online resources and the virtual world are also visible within the experimental group, since the subjects reported significantly higher level of autonomy between GAQ2 and GAQ1 as well as GAQ1 and GAQ3. The same applies to GAQ’s categories, although the differences in the means did not reach statistical significance in majority of cases. This facilitative effect of instruction with the use of Internet resources and the virtual world in learning the past simple tense is also visible in the results of ASES. Here, the experimental learners reported overall more autonomous behavior when compared with their control counterparts. It also has to be added that the differences in the means reached statistical significance after lesson 1 and lesson 2. A possible explanation of such findings might be related to the fact that the members of the experimental group were provided with the opportunity to learn the item in question practically on their own. They could, for example, select grammar activities available on the Internet, check the answers or repeat the exercises when deemed necessary and use the target structure in practice during conversations conducted in the virtual world. By contrast, the students in the control group studied the grammar structure under the strict supervision of the teacher and did exactly what they had been told to do during the classes.

One of the main pedagogical implications emerging from this research project is related to the changing nature of autonomy and the necessity to foster it in foreign language lessons. In view of the fact that the experimental learners became more autonomous immediately after the treatment and then the degree of their autonomy reduced significantly (i.e. from GAQ2 to GAQ3 when traditional instruction resumed in that group) as well as the continuous, albeit small, drop in autonomy among the members of the control group demonstrate the need to support, encourage and guide language learners, perhaps, throughout their entire foreign language education at school. Another teaching implication concerns the means by which learner autonomy could be
developed during foreign language lessons. Thus, in the opinion of the present author, language teachers should seek opportunities to implement Internet resources and virtual worlds in language classes in order to develop autonomy among their students and, at the same time, create environment for practicing foreign language grammar.

6. Conclusions

The study reported in the present paper contributes to the still limited research into the dynamic nature of autonomy in foreign language learning. It is also one of the first to investigate changes in learner autonomy after a series of English classes. The analysis of the quantitative data collected by means of questionnaires provided evidence that autonomy in foreign language learning is not stable and subject to change over time. At the same time, the study showed that the use of online resources and the browser-based virtual world can become an important factor in increasing the level of autonomy in institutional settings.

It is the belief of the present author that some of the main strengths of the study are related to the involvement of one intact class making up two groups of learners (i.e. experimental and control) and the fact that it took place during naturally occurring English lessons. On the other hand, it needs to be stated that the study has a number of limitations. One weakness is related to the small sample of participants, which reduces the generalizability of the results. Another limitation might be related to the completion of questionnaires, especially those administrated immediately after the treatment and after four weeks, which required the study participants to answer the same questions in a relatively short time separating the measures, thus, making the subjects simply weary. At the same time, the administration of yet another grammar autonomy questionnaire (i.e. GAQ4) a few months after the intervention, would have surely offered valuable information about the changing nature of autonomy. Despite these problems, the study may still contribute to future empirical investigations into the dynamic character of autonomy in foreign language learning. This is because highlighting this aspect of the construct may encourage language teachers to incorporate in their own teaching practices at least some autonomy and perhaps improve the efficacy of foreign language instruction.

Acknowledgements

The author would like to express his gratitude to Eliza Manuszak for her invaluable assistance in conducting the present study.

7. References


