



Developing Web-Based Testing Software for LSP. The PUSTULKA Project

Aleksandra Łuczak¹

Kozminski University, Poland¹

Abstract

PUSTULKA is web-based testing software for foreign languages. It was originally developed to cater for the needs of ESP teachers. PUSTULKA emerged as there was no freely available, or inexpensive, software that would be ideal. The imperfections consisted mainly in the lack of cloze/gapped tests or let teachers create databases whose content they could use at any institution they teach.

With PUSTULKA we went even further, and the hidden agenda of the Project was to form a collaborative innovation network (COIN) where teachers learn from one another and develop their digital competence and which goes beyond the confines of one institution. Within the COIN teachers would contribute content and share their exercises with the other contributors so that they all benefit from the growing database of exercises, simplifying their own and one another's work and could use the content anywhere they run their courses.

PUSTULKA was created by a two-person team composed of a programmer, and an ESP teacher. PUSTULKA uses MySQL database, is hosted on Linux server (Debian), and has been written in .NET Core. It works in all browsers and on all devices. Students do not need to create accounts but do the tests on: pustulka.edu.pl.

PUSTULKA is flexible software with which teachers can create various types of exercises that comprise cloze texts, multiple choice, drop-down list, checkbox list, matching, listening, true/false exercises as well as short and long answers. A unique feature of PUSTULKA is that it saves all students' answers automatically and eliminates the risk of losing their work when the internet or equipment fail. PUSTULKA works on a website, so it does not require teachers to download it, to invest in a server or a web domain, and is not confined to the premises of one university.

Keywords: *online language testing, computer-based language testing, English for Specific Purposes, ESP, collaboration, COIN, collaborative innovation network, innovation, web-based language testing, communities of practice.*

1. Introduction

ESP practitioners perform various roles – from the one of a teacher teaching the right skills and, sometimes in the ESP context, the content knowledge, through the ones of a course designer and a materials provider, evaluator evaluating not only the students' performance but also courses they teach and materials they use, to the ones of a collaborator, cooperating with various groups of specialists including subjects experts, other ESP practitioners and students themselves, and a researcher conducting research into new trends in ESP, genre analysis, teaching methodology, etc. [1,4, 8]

New advancements in technology bring new opportunities for teachers, helping them to develop and exceed the confines of their traditional roles, very often crossing the borders of linguistics and drawing from other disciplines. The PUSTULKA project is an example of a venture in which an ESP teacher became an expert on language teaching and testing and collaborated with a software developer in a team working on the development of new web-based assessment software. Such combination seemed ideal, since according to Noijons [6] “to produce good CALT (Computer assisted language testing programs) a test developer must have the following areas of expertise: a) knowledge of language and language proficiency b) expertise in testing c) insight into testing programs, existing programs and programs that are to be developed.” In the PUSTULKA project the software developer possessed the expertise in programming, and a linguist – the ESP teacher/the Author with the knowledge of the language and expertise in testing, which guaranteed that the produced software would let the testers create valid and reliable tests.

Computer or web-based tests (CBTs/WBTs) have many advantages over paper-and-pencil tests (PPTs). According to Parshall et al. [7] the benefits comprise cost saving, automated data collection, simplified scoring, immediate reporting, greater measurement efficiency, innovative item types, and technological provisions for visually impaired test takers. Lent [9] adds that CBTs “improve exam validity as they develop high-quality items and test forms, standardize test administration conditions



and improve exam proctoring, ensure scoring and reporting accuracy, improve examinee access through offering more administration dates, more administration sites, safeguard exam security, prevent unauthorized access to test forms prior to administration, prevent examinees who have already tested from assisting those yet to test.”

All in all the benefits of CBTs/WBTs far outnumber the drawbacks which according to Brown's [2] analysis are associated with “computer equipment availability and quality, limitations in item types, the need for large item banks, expertise and training expenses, anxiety, cheating as well as issues with reliability and validity.” Malec [5] quoting various researchers proves that most of the above downsides are unfounded: the level of computer familiarity is unrelated to the scores in IELTS tests, the testing mode does not have a statistically significant effect, consistent automated scoring contributes positively to test reliability and the young generations of test takers are familiar with computer technologies and the anxiety or fear shall not be regarded as an obstacle.

The main objective of the PUSTULKA project was to create web-based testing software that would cater for the needs of ESP and originally legal English teachers by saving their time on tests scoring through its automatization and tests creation through creation of an easily accessible database of exercises.

The project was preceded with several attempts to find ideal, ready-made software, which unfortunately came to nothing. The reasons for that were varied: from imperfect options available (i.e. a very limited choice of exercises with the omnipresent lack of cloze tests which constitute a core of ESP testing, e.g. Edmodo, Google Forms, Class Marker; confinement of the content created to one institution, e.g. Class Marker, Inspira, Blackboard), through the need to invest in a server and a web domain (e.g. Moodle), to uncooperative university staff responsible for test implementation, editing and compiling the results.

The PUSTULKA project has also proven that collaboration with a software developer may be a solution for teachers who do not possess extensive knowledge of computer science but still want to participate in software development projects. And on top of that teachers do not need to possess extensive digital competence or even may have less computer knowledge than their students to use technology creatively in language learning.

2. PUSTULKA specification

PUSTULKA software uses MySQL database, is hosted on Linux server (Debian), and has been written in .NET Core. It works efficiently on computers and mobile devices. Technical requirements to use it in the classroom are: the internet connection and standard internet browsers which use HTML5 and JavaScript (e.g. Google Chrome, Chrome for Android, Mozilla, Edge, Internet Explorer). To sit a test, students do not need to register or create an account but only go to a website: pustulka.edu.pl and enter a test code provided by their teacher. To see a sample test, go to PUSTULKA website and use test code: 5773.

Teachers who want to use PUSTULKA daily need to create accounts. To start using PUSTULKA they can set up a free trial account with which they can create private exercises, build and assign tests without any limitations but they cannot see or copy other teachers exercises. Trial accounts can be set up on: pustulka.edu.pl/Account/RegisterTrialAccount.

3. PUSTULKA functionality

PUSTULKA has been designed so that the teachers using it create exercises and out of the exercises stored in their database they build tests. Such model allows for flexibility and gives teachers a lot of freedom in building various versions of tests. The exercises the teachers create have four levels of access: private – where the exercise is only available for its author, teacher – where the exercise can be shared with other teachers who can copy it, edit and use for their own purposes, public – where the exercise is available to anyone who has a link, and public hidden – where the exercise is available to anyone with a link but is not visible on the list of public exercises. The whole collection of PUSTULKA public exercises is available on: pustulka.edu.pl. With public exercises students can learn or revise material outside the classroom which introduces the element of e-learning into the course. In summer 2018 the Author was carrying out a One Exercise a Day (OEAD) project which was designed to enrich the collection of PUSTULKA public exercises by creating one every day. Currently the collection of public exercises comprises over 250 items which can be done online or printed.

With PUSTULKA teachers may create cloze texts, multiple-choice, drop-down list, checkbox exercises as well as short and long answers. Exercise types have been carefully chosen to meet the needs of ESP teachers and ESP certificate preparation, e.g. TOLES (Test of Legal English Skills) examinations. The software has been adjusted specifically to the needs of the teachers who do not



need to possess any knowledge of coding. To create the exercises, the teachers “parse” texts i.e. transfer them from plain text documents to the application. The texts only need to be previously properly formatted in a Word or any other plain text editor e.g. Notepad. The examples of formatting commands for parsing are presented below in Figure 1:

For inserting a picture:

[p;https://upload.wikimedia.org/wikipedia/commons/1/15/Accipiter_nisus_-in_flight-8.jpg]

For bolding text: [b; From a lease agreement]

For underlining text: [u; From a lease agreement]

For italicizing text: [i; From a lease agreement]

For numbering items:

[n]From a lease agreement

[n]From a lease agreement

[n]From a lease agreement

For inserting a link: [l; http://pustulka.edu.pl/]

Fig. 1. PUSTULKA commands for text editing

The description below illustrates the procedure for creating a cloze test/gapped text exercise in which there can be up to five correct answers. In a plain text document (e.g. Word or Notepad) or in a parsing window on PUSTULKA website testers:

- type or paste the text of their exercise
- put square brackets around the words which constitute the maximum of five correct answers separating them by colons
- specify the number of points to be awarded by typing it after the last correct answer in a bracket and a colon
- the application automatically awards one point if testers do not specify the number of points to be awarded (the same can be pre-prepared in Word or Notepad and only pasted to the parsing window).

The text before parsing is formatted in the following way:

ADR typically includes, but is not limited to: negotiation, conciliation, mediation, and [arbitration]. Some of these programs are [voluntary]; others are mandatory.

While the two most common forms of ADR are arbitration and mediation, negotiation is almost always attempted first to [resolve;settle] a dispute. It is the preeminent mode of dispute resolution.

Fig. 2. Plain text version of a gapped text/cloze test

The exercise looks the following on PUSTULKA and can be accessed at pustulka.edu.pl:

ADR typically includes, but is not limited to: negotiation, conciliation, mediation, and (1 p.). Some of these programs are (1 p.); others are mandatory.

While the two most common forms of ADR are arbitration and mediation, negotiation is almost always attempted first to (1 p.) a dispute. It is the preeminent mode of dispute resolution.

Fig. 3. A sample of PUSTULKA cloze/gapped text exercise

To help teachers, the Author has recorded video tutorials on how to create various types of exercises. They can be found in HELP section on PUSTULKA website: pustulka.edu.pl. HELP section also contains a pdf manual where users can check how to use various functionalities of PUSTULKA if they prefer a text version of instructions.



4. Testing with PUSTULKA

Teachers using PUSTULKA build tests out of exercises they have prepared in advance. Such solution gives them a lot of flexibility in editing new versions of a test. When assigning tests teachers can decide whether the students sitting the test will be able to see their answers or not after submitting the test. However, the students will always see their partial result after submission. PUSTULKA saves the results automatically and eliminates the risk of losing a student's work if the connection or equipment fail. A student can easily return to a test they have already started using a student code which is generated at the very beginning of a test.

Teachers can also select the closing date for a test which can be useful when assigning some tests for homework. They can also set the time limit for doing a test, after the lapse of which the test submits by itself. The exercises in the test can be shuffled so that each student does them in a different order to prevent cheating. Teachers may also disable previous button so that students cannot go back to previous exercises and they can only move forward during the test. A test prepared by a teacher can be exported to a WORD file where it is still editable and printed if the situation requires a paper-and-pencil version of the test.

With PUSTULKA testers may award additional points manually for minor spelling mistakes or correct, alternative answers not included in the answer key.

After grading teachers may export test results to Excel files for more detailed analysis, filtering them according to various criteria, as well as for mistakes (and errors) analysis. A completed test can also be printed to show to a student and consult them on the mistakes they have made.

5. Conclusions

The assumptions behind the PUSTULKA project were to create software which would save teachers' time and develop their digital competence. Moreover, it was meant to inspire creativity, facilitate collaboration and knowledge sharing through the function of sharing and commenting one another's exercises, and through joint forces to develop new products, provide innovative services and modify processes.

In fact, the hidden agenda of PUSTULKA is to build a teachers' Community of Practice by inducing cooperation among them. Communities of Practice (CoPs) refer to groups of people who genuinely care about the same real-life problems or hot topics, and who on that basis interact regularly to learn together and from each other. At present COPs evolve towards collaborative innovation networks (COINs) which according to Peter Gloor [3] are "groups of self-motivated individuals from various parts of an organization or from multiple organizations, empowered by the Internet, who work together on a new idea, driven by a common vision".

The assumption is that teachers contribute high quality content to the application and share some of their exercises with other contributors. In this way teachers benefit from the growing database of exercises, simplify their own and one another's work, save time on designing and evaluating tests. Teachers who use the coursebooks or teach similar courses may manage joint projects aimed at developing their own materials, digitalizing authentic materials, administer examinations, etc.

A competitive advantage of PUSTULKA is its feature which does not confine teachers to use the content they create at a single school/university only and lets them create the resources that they can exploit throughout their professional careers.

So far, the feedback collected among teachers has been very positive. They consider the software as very useful and easy to use. Those who participated in an in-house examination at a university carried out by means of PUSTULKA appreciated the time saved on checking tests, since they had check one out of seven sections contained in an examination paper. The remaining six were graded automatically. All the teachers assessed the procedure of administering the examination as clear and efficient.

Another survey conducted among students proved that PUSTULKA fulfilled its task of a student-user friendly application. Only one student out of 61 respondents described their experience as rather negative but did not provide any specific reasons justifying such an opinion. Moreover, the comparison of PUSTULKA-based tests results with PPTs and other WBTs showed no significant discrepancies. Different groups of students achieved highest scores irrespective of the test mode. Therefore, some students' worries concerning being assessed by a machine and underprivileged because of the medium of assessment seemed unjustified.

PUSTULKA software is now up and running. Its content is still growing, new teachers join the network and learn using it. The PUSTULKA team is available and open to implementing new functionalities, repair bug, and resolve issues. PUSTULKA is currently used for testing English, Spanish and Polish languages.



Since October 2019 PUSTULKA users have created over 970 exercises and over 180 tests which have been assigned over 250 times to around 1700 students. Over 250 exercises are public ones, i.e. can be used by anyone who enters the website. Its Author was awarded Kozminski University Award for innovation in teaching in 2018/2019 academic year.

If you would like to become part of PUSTULKA, please contact the Author at:

luczak.aleksandra@gmail.com or info@pustulka.edu.pl.

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