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ACTION RESEARCH INTO TECHNOLOGY-ASSISTED WRITING FOR PUBLICATION

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Abstract: The paper summarizes the findings of the study of the technology-assisted approach to teaching academic writing to graduate students. The purpose of the research was to verify the effectiveness of the software interactive tool, *Academic Discourse Organizer (ADO)*, designed at Tambov State Technical University. The ADO, based on the guided approach to writing, navigates the learners through the writing process, teaching them to present the findings of the research in a user-friendly format.

The study involved two groups of students learning to write a research paper in English. The teaching in the experimental group was organized using the ADO, while the control group had traditional classes. The study confirmed the hypothesis that technology-assisted teaching facilitates the learning process and helps graduate students to acquire the necessary writing skills faster. The user-friendliness of the tool and its functions help students to accomplish their writing goals more effectively.

Introduction

In the 21st century classroom, using technology tools for learning and teaching purposes has become a "must". Today, we cannot imagine a teacher who does not use a computer, or a laptop. Modern classrooms are equipped with overhead projectors, interactive whiteboards, or interactive panel systems. As a result of this, new methods of teaching and learning keep replacing the traditional ones.

In fact, the emergence of technology-assisted pedagogies in the system of education as a whole, and in teaching foreign languages in particular has become possible owing to the changes occurring in the society over the past

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15-20 years. The rapid development of the Internet, the availability and affordability of gadgets, the emergence of a new type of learner and the shift in understanding the concept of literacy are just a few of them. These changes have brought about the need to customize learning and teaching to the new requirements of the modern world.

The new type of learner

The first thing to bear in mind is that today teachers have to deal with a new type of learner. This new generation of learners, which is often called the Gen Z, iGeneration, Post-millennials, have grown up in a hyper-connected world. They have been familiar with computers, laptops, tablets and smartphones since an early age. As a result, their preferred method of communication is smartphone and they tend to use the Internet for problem-solving, networking, communicating, learning, and buying [1]. The fact that they prefer to do things online has had an impact on the way they deal with information, sort out problems and organize their learning.

Obviously, fitting into this new digital age involves becoming comfortable and open with technology. It is noteworthy that even a few years can make an immense difference when it comes to technology. The iGens are excellent tech users with some hands-one experience of using digital technology. They possess computer skills that may enable them to customize the apps, websites and software they use, and create new ones.

A new meaning of literacy

In the digital age the concept of literacy which has traditionally been understood as the ability to read, write and do arithmetic, has acquired a new meaning going beyond the three R's. Today, literacy implies the knowledge and skills to use technology for educational purposes. This means that a new learner must possess skills which fall in the category of "digital literacy". They are part of the 7C Skills and include information literacy, media literacy, and ICT literacy [2].

In order to enable students to use software tools for educational purposes it is necessary to provide them with technological resources. At the same time, it is important to encourage teachers to apply new pedagogical methods promoting learning with technology.

The biggest advantage of using computer integration solutions is that teachers guide students in their use to accomplish their goals. Students are guided by teachers and learn how to organize and present the results of the research in the appropriate form. On the one hand, students work independently and get a unique learning experience as they discover knowledge by themselves. On the other hand, their learning is scaffold by the teacher who is ready to step in with ideas and guidance.

Selecting technology for EFL purposes

Teaching with technology includes the use of different tools, both integrated with the institutional learning management systems and those which work independently online. Most universities offer e-learning courses, blended-

learning programs and materials for different courses designed for students enrolled in their programs.

The idea of technology-assisted teaching is not new. However, recently, there has been a shift from teaching to use technology (computer science, basics of information science) to teaching with technology (i.e. using technology tools to facilitate learning). This new idea has acquired different names, such as "computer facilitated training", "computer-based instruction" [3], "computer-assisted instruction" [4, 5], "computer-enriched instruction" [4], "computer-managed instruction" [6]. All these terms basically mean the same – using computer, or any other digital device for learning purposes.

The choice of technology tools depends mostly on their compatibility with the teaching and learning objectives associated with the courses and/or their individual units [7]. As stated by McIntyre, "[d]on't simply use technology as an 'add-on' to the class. There must be a logical reason and purpose for the inclusion of any [technological] tools [into our courses]" [8, p. 4].

As we described earlier [9], the new demands for university graduates include the ability to write papers in English and be able to cope with challenges of academic writing, such as understanding of the structure and the format of the paper, the requirements for publications in international journals, the step-by-step algorithm of organizing work on the text, editing and proofreading. Also, they have to be familiar with the procedure of a research experiment and ways of describing it, visualizing and presenting research data, dealing with literature review, as well as being able to evaluate their findings critically and draw relevant conclusions.

This resulted in the design and creation of a practical software tool, called Academic Discourse Organizer (**ADO**) to meet the new demands of the digital age and to facilitate the learning process of students who feel absolutely comfortable using technology for learning purposes. The ADO is a website that utilizes a guided writing approach to teaching to write a research paper. It is available for free to all users, no matter where they are affiliated. All you need to do is to create an account, save the login and password. The website is anonymous as neither registration, nor submitting any personal data is required.

The website has a number of tabs: *My Archive*, which contains a collection of the author's articles already written on this site; *My Library,* which stores literary sources and short notes that the author compiles while reading for a research project; and *My Projects,* which has articles that the user is currently working on. Each of these tabs serves its own purpose and is supposed to organize the writing process effectively. The sections are user-friendly and easy to navigate. For example, *My Projects* contains the basic data about the paper, including the title, the date of creation, and a "delete" option. The functionality and the possibilities of using the website to teach students and young scholars to write research papers were described in [9].

In this paper, we will present the findings of a one-year piloting project of the course for graduate students using the technology assisted approach to teaching to write research papers in English.

The need for action research

The ideas of developing the skills of academic writing in graduates and postgraduates needed to be tested in a dedicated action research. The research was to be conducted during regular lessons in order to accumulate practical experience and draw informed conclusions about the instrumentality of the suggested instruction techniques. The focus of instruction was teaching to write a research article – the most demanded skill among students and practicing specialists.

In order to prove the practicality of teaching the skills of writing a research article to post-graduates, action research was designed. It was based on the course book "Research Article Writing: a Course for Graduates, Post-Graduates and Specialists". The materials were freely available to students at http://academic.tstu.ru/

The topics for instruction were as follows: introduction to the problem, research article anatomy, research journals requirements, article review writing, literature review writing, experiment description, data presentation, discussion of findings, article production, editing your article. The Appendix to the book included "language bank" with useful research phraseology and text chunks.

A questionnaire of 20 questions in the form of statements relating to research article writing skills was distributed among 40 postgraduates taking their regular course of English as a foreign language. Among the participants were students from Russia and Iraq, all taking their post-graduate course at Tambov State Technical University.

According to the syllabus, the post-graduates attended a lesson a week with each lesson lasting for 90 minutes. Action research lasted for 32 weeks and the course took 64 academic hours (an academic hour in Russia lasts 45 minutes) to complete.

During the course, the participants followed the program presented in the course book "Research Article Writing: a Course for Graduates, Post-Graduates and Specialists". In fulfillment of the program they were doing a number of tasks in the electronic simulator presented at http://academic.tstu.ru/

Electronic simulator featuring certain elements of artificial intelligence was designed to combine the intellectual potential of the human mind and the operations performed by the machine (automatic formatting bibliography list of the article, semi-automatic production of the summary, key words list and research conclusion, assistance in compiling a resource pack of prior publications on the subject under research and others).

At the end of the academic year, the postgraduates were asked to express the degree of their agreement with the statements in the questionnaire using the following scale: +3 strongly agree, +2 agree, +1 partially agree, 0 no idea, –1 partially disagree, –2 disagree, –3 strongly disagree.

The statistical analysis was performed with the software package "IBM SPSS Statistics".

Descriptive statistics

The descriptive statistics of the questionnaire responses are given in Table 1. As shown in Table 1, the statements produced the students' responses with the minimal answers varying from –3 to +3. The only statement that evoked the highest positive response in some graduates of +3 was "I can write article in my native tongue" with the value of standard deviation equal 0.0. Writing in English still remained a challenge with the postgraduates whose level of English was lower than B2. For those students a separate program was designed teaching them to enable them to produce a rough copy of their article in English using translation technologies.

The number of statements that produced the minimum of points in some graduates was considerably higher, including editing their articles, writing a conclusion, presenting and discussing data etc.

Some graduates had problem with writing a literature review caused by insufficient level of their English. The way out was found in teaching them to use translation technologies.

However, quite a few students boasted good knowledge of international journal requirements that they analyzed during the academic year of our action research.

The highest deviations were registered in responses to the statements "I can present research data" and "I write a conclusion". The reason was that generating and presenting research data required a good deal of independence to which postgraduate students were not yet accustomed.

Table 1

Descriptive statistics

Statements	Min.	Max.	Mean	Std. Deviation
I can now write a research article	–1.00	2.00	.900	.73786
I know how to write a research article	0.00	2.00	.900	.56765
I know how to plan a research article	–1.00	2.00	.700	.82327
I know the structure of the article	–1.00	2.00	.700	.82327
I know the requirements of the journals	0.00	2.00	1.400	.69921
I know the language of research style	–3.00	2.00	.600	1.34990
I can write an article review	–2.00	2.00	.600	1.50555
I can write a literature review section	–2.00	2.00	.700	1.33749
I know how to describe an experiment	–3.00	2.00	.900	1.52388
I can present research data	–3.00	3.00	.800	2.09672
I can discuss my research findings	–3.00	3.00	.900	1.85293
I can edit my research article	–3.00	2.00	–.200	1,75119
I can write a conclusion	–3.00	3.00	.100	2.13177
I can compile a bibliography	–1.00	3.00	1.300	1.49443
I can write articles in my native tongue	3.00	3.00	3.000	.00000
I can use the site http://academic.tstu.ru	–2.00	3.00	2.200	1.54919
I can produce a whole article	0.00	3.00	2.200	1.03280
I can help others write a research paper	–3.00	3.00	1.900	1.91195
I can help others structure their paper	–3.00	3.00	1.700	1.94651
I can help others edit their paper	–3.00	3.00	1.700	1.88856

Correlation analysis

The purpose of the correlation analysis was to find out the hidden links between the students' responses to the questionnaire statements. The presupposition was that those hidden links would enable the researcher to get a deeper understanding of some mutual dependencies behind the attitude of our graduates towards English language learning.

For the correlation analysis only the links significant at the level of $p = 0.01$ and $p = 0.05$ were considered.

The most developed network of correlations was found out among such notions as:

I can write a research article.

I can compile a bibliography.

I can write articles in my native tongue.

I can use the site http://academic.tstu.ru

I know the requirements of the journals.

The weakest correlation links were found for the item:

I know the language of research style.

These items formed a correlation galaxy with their quotient values. They were well interpretable providing valuable insight into understanding the process of research article skills development. E.g. the knowledge of the research style language was perhaps the weakest link in the scope of post-graduates' competencies, hence, it got isolated in the correlation network.

Cluster analysis

A hierarchical cluster was built based on the results of the questionnaire responses. The purpose of this statistical exercise was to analyze the semantic similarity and relationship among the graduates' responses to the statements of the questionnaire.

The peak of the hierarchy was framed by the notions of "The knowledge of "HOW"" and "The ability TO". Further down the hierarchy were the notions of "Language Knowledge" and "Data Analysis". The further step down was "Writing in English".

The hierarchy indicated that semantically there were three meaningful clusters grouping together all the graduates' responses to the questionnaire statements:

– Knowledge of how to write a research article.

– Specific skills of writing a research article.

– Communicative competence in the research areas.

The above clusters revealed the semantic structure behind the students' responses and indicated the areas to be addressed in rethinking the practice of teaching skills of research article writing to post-graduate students.

Pilot Results and Challenges

The results of the pilot show that the ADO works well for graduate students working on their first article in English. This technology tool facilitates the writing process, making it better organized and hassle-free due to automated

and semi-automated functions. At the same time, learners improve their skills in structuring the article structure sticking rigidly to rules of academic writing.

This software was incorporated into the face-to-face course aimed to teach graduate students to write a research paper in the IMRAD (Introduction – Methods – Results – Discussion) format. They also worked on the language and practiced paraphrasing, summarizing, and editing techniques.

The use of the ADO software significantly increased the learner autonomy in doing their writing, while the teacher acted as a facilitator, rather than an instructor.

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Обучение письменному научному дискурсу с применением компьютерных технологий

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Ключевые слова: академическое письмо; компьютерное обучение; интерактивный ресурс; научно-исследовательская статья.

Аннотация: Обобщены результаты исследования по обучению письменному научному дискурсу с применением компьютерных технологий. Цель исследования состояла в оценке эффективности использования интерактивного ресурса, *Academic Discourse Organizer* (*ADO*), разработанного в Тамбовском государственном техническом университете. В основе применения данного интерактивного ресурса лежит использование алгоритмизированного подхода к организации процесса письма для формирования навыков представления результатов исследования в формате научной статьи.

Исследование проводилось в двух группах аспирантов. Обучение в экспериментальной группе было организовано с использованием интерактивного ресурса, а в контрольной группе проводились традиционные занятия. Результаты исследования подтвердили гипотезу о том, что обучение с использованием компьютерных технологий способствует повышению эффективности занятий и формированию необходимых навыков. Функционал программы позволяет аспирантам быстрее справляться с поставленными задачами.
