UDC 004.91

**PROBLEMS OF USING LATEX AND BIBTEX SYSTEMS IN THE UKRAINIAN SCIENTIFIC ENVIRONMENT**

Popov R. O., Karpenko N. V. ([popov\_r@365.dnu.edu.ua](mailto:popov_r@365.dnu.edu.ua), [karpenko\_n@365.dnu.edu.ua](mailto:karpenko_n@365.dnu.edu.ua))

Oles Honchar Dnipro National University (Ukraine)

*The thesis deals with the problems of using LaTeX and BibTeX systems in the scientific environment in Ukraine. It is shown that despite the high level of digitalization of the scientific process in Ukraine, these tools for preparing scientific texts and managing bibliography have not yet found wide application in Ukrainian universities. The main problems faced by researchers when using LaTeX, including software installation, Cyrillic alphabet settings, and formatting management, are investigated. The shortcomings of BibTeX are identified, in particular, the lack of an official citation style in accordance with DSTU. It is emphasized that LaTeX and BibTeX can greatly facilitate the process of writing scientific articles and managing bibliographies if the existing problems are solved. The possibilities of further implementation of these systems in scientific practice in Ukraine are discussed.*

**Introduction**. Modern scientific activity in Ukraine is characterized by a high level of digitalization and integration with international standards. Universities actively use electronic repositories such as DSpace and EPrints to store publications, and journals accept articles in Microsoft Word formats. Video platforms such as Zoom and Google Meet facilitate scientific communication. After completion, articles are published in databases such as Scopus, Web of Science, and Google Scholar, providing global visibility. [1].

Despite the significant development of the scientific environment in Ukraine, certain aspects of the scientific process, such as the creation of scientific articles and the organization of bibliographies, require further automation and improvement. Writing an article is a complex and resource-intensive task, and it is in this area that it is particularly important that software systems do not interfere with, but rather help the researcher in writing his or her work.

Currently, the format of electronic articles in Ukraine is mostly Microsoft Word (sometimes OpenDocument). The disadvantage of this technology is the considerable time spent on formatting instead of content. In case of refusal to publish, the researcher is forced to reformat the article for another journal. Bibliography also causes difficulties because office systems do not have convenient tools for citation (although there are plug-ins for Word). In addition, Microsoft Word is a closed solution that runs only on Windows, making it difficult to extend and automate.

To solve all these problems, you can use the LaTeX and BibTeX systems (which are used mostly in A scientific journals, but not all of them). These are powerful tools for preparing scientific texts and managing bibliographies that are widely used in foreign scientific communities. LaTeX provides high-quality document design, automated markup, and the ability to easily work with mathematical formulas, tables, and graphics. BibTeX simplifies the work with bibliographic sources by allowing you to automatically create and update bibliographies. The main advantage of LaTeX and BibTeX over Word is greater flexibility and control over the document format, especially for complex scientific papers where it is necessary to work with multi-page documents and a large number of references [2].

**Problem statement**. LaTeX and BibTeX are de facto and de jure standards in the foreign scientific tradition. Currently, there are many educational materials for these systems. The question arises: why are such programs not used in Ukraine? In fact, it is not easy to set them up correctly the first time, and the use of these systems is very different from Microsoft Word.

In this paper, we would like to consider the problems in using the LaTeX and BibTeX systems and ways to solve them in the hope that this culture will become more widespread in Ukraine.

**The essence of the study**. The first step is to install LaTeX on your computer (BibTeX does not). This step can already cause a number of problems, as it is an open source product with a long history, and was developed primarily for Unix/Linux systems, not Windows. LaTeX also does not have a specific company that takes care of the ease of software distribution. But this problem can be solved by installing the MiKTeX distribution, which provides a convenient and familiar installer.

Next, you need to configure the software to edit .tex (LaTeX) and .bib (BibTeX/BibLaTeX) files. In order to edit and compile .tex files conveniently, it is enough to use TeXMaker or TexStudio editors. .bib files are organized using bibliography management systems, and the JabRef program was created specifically for .bib files. You can also use other programs such as Zotero, but then the bibliography must be exported separately to .bib files.

There are a few small problems when writing the main text of the article. You may notice that the document margins are very large by default, which can be easily adjusted with the geometry package (*\usepackage[a4paper, margin=2cm]{geometry}*). In foreign languages, the first line of the first paragraph of text in a section is not indented, but with LaTeX this can be easily overcome with the indentfirst package (*\usepackage{indentfirst}*). Another problem you may see with paragraphs is alignment. By default, LaTeX uses width alignment, but the algorithm works best with word hyphenation, which is not allowed in Ukrainian articles. To eliminate this drawback, you need to add the *\emergencystretch 3em* command to the very beginning of the document.

Some titles in the document may appear in English (for example, “Fig.” instead of “Fig.”, “References” instead of “References”). In order to customize all inline titles in LaTeX, you need to include the babel package with the ukrainian parameter (*\usepackage[ukrainian]{babel}*). In addition, this package can also be used to enable correct word hyphenation for the Ukrainian language.

A separate setting is required for pictures. The fact is that LaTeX was originally positioned as a publishing system, so when creating figures, LaTeX chooses the most convenient place in the text. This leads to the fact that the figure is not located where the researcher expects it to be. To do this, specify [H] in the figure parameters (*\begin{figure}[H]*).

With all the settings above, LaTeX is ready to be used in the Ukrainian language and with the Ukrainian traditions of document creation and execution. LaTeX is an artificial computer language. It is clear and rigorous, and there are currently no full WYSIWIG-style editing tools (like Microsoft Word). In addition, it is difficult to create a completely custom formatting in LaTeX (or rather, it is possible, but requires a deeper study of the system). However, at this stage, the researcher has all the tools to write his or her article, which will eventually have a strict and clear formatting (without problems with fonts or the position of figures). Further changes in style only relate to the specific requirements of the journal.

We need to add a few words about BibTeX. It is an electronic format for citations that stores them in a unified form (in the form of a key-value) [3]. This approach allows you not to be tied to a particular citation style. This is especially important when a researcher changes the journal in which he or she wants to be published, but this journal has different citation requirements. With BibTeX, this is not a problem: just change the style and the citation and bibliography section will be automatically changed. With *\cite{...}* commands, there is no need to keep track of citation numbers and the required order of citations. Electronic systems are designed for this purpose to reduce the amount of manual and tedious work.

Despite these advantages, there are some problems with using BibTeX in Ukrainian science. First, there is no official citation style that would implement the DSTU 8302:2015 standard. Secondly. Secondly, BibTeX does not officially support UTF-8 (and thus Cyrillic), but there are no problems when used with a properly configured LaTeX. Thirdly, since many Ukrainian scientific journals do not have DOIs, BibTeX has to be entered manually. Instead, the DOI provides complete information about a scientific source and allows you to cite it correctly in your article.

**Conclusions**. Thus, in this paper, we have considered the main points of using LaTeX and BibTeX. Using LaTeX for writing Ukrainian articles is somewhat difficult, as this system (by default and without additional customization) has problems with Cyrillic, fonts, font sizes, and text hyphenation. As for BibTeX, there is no official support for DSTU (but there are unofficial implementations).

An alternative solution for creating high-quality papers is to use Mendeley and Mendeley Cite for Word. This will simplify the writing of papers by organizing citations, but the document formatting capabilities remain at the Word level. This may be enough for philologists, but for technical sciences, LaTeX offers many solutions for designing complex graphs, charts, diagrams, and even presentations.

Implementation of the LaTeX ecosystem in Ukraine is a complex process, as not all scientists have sufficient skills to install complex software. This process requires a gradual change in human thinking from “easy to use, but not always convenient” to “mastering a more complex tool with much greater capabilities.” And the labor costs of installing, configuring, and learning LaTeX are offset by the convenience and additional features that are useful for writing technical articles.

**Список використаної літератури**

[1] Г. Губаль, “LATEX як видавнича система для створення математичних текстів і для програмування,” Комп’ютерно-інтегровані технології: освіта, наука, виробництво, no. 12, pp. 23–26, 2013.

[2] Л. Лупаренко, “Еволюція відкритих електронних науково-освітніх систем і їх використання у вітчизняному освітньому просторі,” Збірник наукових праць Національної академії Державної прикордонної служби України. Серія: педагогічні науки, vol. 2, no. 25, pp. 236–272, 2021.

[3] M. Osborne, Using BibTeX: a short guide. 2024. [Online]. Available: https://www.economics.utoronto.ca/osborne/latex/BIBTEX.HTM