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RESEARCH ON POSSIBILITIES OF APPLICATION OF FREE OPEN SOURCE SOFTWARE IN EDUCATION

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Анотація

Безкоштовне програмне забезпечення з відкритим кодом надає багато переваг як навчальним закладам, так і їхнім студентам. Серед них сумісність зі старим обладнанням, глибина налаштування відповідно до потреб окремої школи/університету, заощадження на дорогих ліцензіях на програмне забезпечення. У цій роботі досліджуються існуючі випадки впровадження безкоштовного програмного забезпечення з відкритим кодом у навчальних закладах, а також альтернативи популярним пропрієтарним програмним забезпеченням.

Ключові слова: вільне програмне забезпечення з відкритим кодом, освіта, комп'ютери.

Abstract

Free open source software provides many benefits to both educational institutions and their students. Among them are compatibility with older hardware, depth of customisation to suit the needs of a separate school/university, financial savings on expensive software licenses. This work explores existing cases of adoption of free open source software in educational institutions, as well as alternatives to popular proprietary pieces of software.

Keywords: free open source software, education, computers.

Introduction

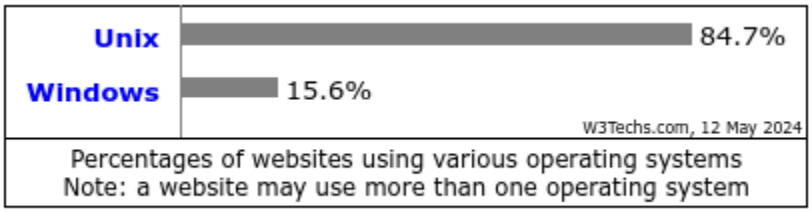
In the several past decades computers have become an integral part of human societies. We use them in every sphere imaginable, from modeling to communication and recreation. However, unlike smartphones, a modern personal computer is a device that requires prior training to effectively utilize. Nowadays educational institutions are the ones to effectively provide this training.

From a user standpoint, software is the most important part of a computer. These are the tools we use to extract value from the computational capability of a computer, be it to read and write documents, emails, process and consume media, et cetera. Software varies greatly depending on the function and target system, which also means that most pieces of software require users to spend time and effort to get accustomed with their workflow.

At the same time every piece of software requires specifically educated specialists and a considerable amount of time to produce. As such, a piece of software is most often distributed either as a product or as a subscription to a service. However, this approach greatly hinders the freedom and quality of education. Not only do educational institutions have to acquire and maintain expensive hardware with ever increasing computational demands, they also must purchase licenses for the software to run on them. As a result, many schools and universities must compromise on the quality of computer education, limiting their students to the objectively subpar experience of using proprietary software on outdated hardware. Free open source software can help remediate this issue.

By definition, Free open source software (FOSS) is software that is licensed to be free to use, modify, and distribute [1]. The practical implications of this is that anyone, a person or a company. can freely download, use in both personal, educational and commercial purposes, share and modify any piece of software that is licensed under one of FOSS licenses.

Probably, the most well known example of FOSS is the Linux kernel, which is the core of the GNU/Linux operating system [2]. Apart from powering more than 80% of web servers across the internet, as shown on picture 1 [3], It allows anyone in possession of a computer to use it with no additional costs.



Pic 1. Comparison chart of operating systems across website servers.

When compared to Microsoft Windows – the family of the most popular operating systems for desktop computers in the world. There are several notable advantages that Linux-based operating systems provide. The most obvious one is the cost. A personal Windows license can cost anywhere between $100-$200, the educational license requires either ~$350 a year per computer room with 16 computers in it or $250 or more per a new device with it pre-installed. With higher computer counts the costs can escalate massively. Also, with Windows 10 support ending on October 14, 2025 and hardware restrictions posed by Windows 11, many existing computers in schools and universities will not be able to run it. This leads into another advantage of Linux – hardware requirements. Windows 11 requires 4 gigabytes of RAM and 64 gigabytes of storage to install. Meanwhile, most modern Linux distributions state only 2 gigabytes of RAM and 10 to 20 gigabytes of storage as their recommended requirements. This obviously means that Linux consumes less system resources to run itself [4], which leaves more room for user applications and grants smoother experience.

There are also free open source alternatives available for most popular proprietary software suites, such as LibreOffice, which provides the same features as Microsoft Office. The most popular of Adobe Creative Suite programs can also be substituted with several free pieces of software, namely Krita and GIMP for Adobe Photoshop, Inkscape for Adobe Illustrator, Audacity for Adobe Audition [5]. Some FOSS software, like Blender, 3D model editor and composer, are already in a position of being the industry standard.

Another argument in favor of adoption of free open source software is that the students are not required to purchase the licenses for the software to either practice it at home or apply the skills they learned with it. A lot of households, especially in developing and transitioning countries cannot afford expensive software licenses. It is a duty of educational institutions to inform their students of existing free solutions and alternatives.

The drawbacks of adopting FOSS mainly include the lack of more substantial technical support from a commercial entity backing the software, as well as the upfront cost to remake existing curricula to leverage FOSS software instead of the proprietary. However, as mentioned before, with the end of support

for Windows 10 next year, a lot of educational institutions with older computer fleets will be met with a costly dilemma of hardware obsolescence.

A great example of using FOSS in education is the Indian state of Kerala. They estimate more than $400 million in license fees in 2024 by switching their 200,000 school computer fleet to Linux [6]. These funds can then be redistributed to improve other aspects of education without impairing the quality of IT lessons.

Conclusion

Free open source software provides great possibilities to educational institutions worldwide. It allows them to leverage the savings from license fees to allow for better quality of education, while the students learn skills that do not require them to purchase expensive software to use. It can also bolster the interest in the free open source software scene, which in turn provides competition to established proprietary software.

СПИСОК ВИКОРИСТАНОЇ ЛІТЕРАТУРИ

1. Feller, Joseph, ed. (2005). *Perspectives on Free and Open Source Software*. MIT Press.
2. Linux Kernel Organization, About Linux Kernel [Електронний ресурс]. – Режим доступу: https://www.kernel.org/linux.html
3. Q-Success, Usage statistics and market shares of operating systems for websites [Електронний ресурс]. – Режим доступу: https://w3techs.com/technologies/overview/operating_system
4. Deian. GNU/Linux user manual [Електронний ресурс]. – Режим доступу: https://www.debian.org/releases/stable/i386/ch03s04.en.html
5. Open Source Alternative, Open source alternatives to popular SaaS. Електронний ресурс]. – Режим доступу: https://www.opensourcealternative.to/
6. JAbhishek Prakash. Good News! Indian State Aims to Save Over $400 Million by Choosing Linux. [Електронний ресурс]. – Режим доступу: https://itsfoss.com/kerala-linux/

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