PORTFOLIO # 4

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BSIT - 1 (MW 1:30 - 3:00)

OVERVIEW

1. COMPUTER HARDWARE
2. COMPUTER SOFTWARE
3. IMPLEMENTATON ON DIFFERENT ISTITUTIONS
4. REFLECTION/ANALYSIS
5. CITATION

COMPUTER HARDWARE

Computer hardware refers to the physical components of a computing system, things you can touch, such as the motherboard, CPU, memory modules (RAM), storage drives, input/output devices, and network cards. The hardware works in tandem with software, which gives instructions and logic to make the hardware perform tasks.

TYPES OF HARDWARE

Internal hardware

CPU (processor), motherboard, RAM, ROM, cache, SSD or HDD, graphics card.

External hardware/ Peripherals(I/O)

keyboard, mouse, monitor, printer, scanner.

Networking hardware

routers, switches, network interface cards (NICS), modems.

KEY HARDWARE COMPONENTS

- CPU (Central Processing Unit): the "brain" of the computer; it fetches, decodes, and executes instructions.
- Memory / RAM: temporary, volatile storage holding data and instructions while the system is powered on.
- Storage (HDD / SSD): non-volatile storage for files, programs, and OS. SSD is faster than HDD.
- Motherboard / system board: a circuit board that connects all components, enabling communication.
- Peripherals (input/output): keyboard, mouse, monitor (output), scanners, etc.
- Cooling, power supply, bus systems: to maintain stable operation, supply power, and provide data pathways between components.

COMPUTER SOFTWARE

Software is the intangible set of instructions or programs that tell the hardware what to do. Without software, hardware is inert; without hardware, software cannot run.

TYPES OF SOFTWARE

SYSTEM SOFTWARE

- Operating systems (OS): Windows, Linux, macOS — manage hardware, provide user interface, coordinate tasks.
- Device drivers / firmware: low-level programs providing interface between OS and hardware.
- Utilities / tools: e.g. antivirus, disk management, backup utilities.

Open source vs proprietary software

- Open source software: source code available publicly; users can modify and distribute.
- Proprietary software: closed source, controlled by a vendor.

Application software

- End-user programs: word processors, spreadsheets, media players, web browsers, etc.
- Specialized software: e.g. accounting, graphic design software, engineering software.

Middleware / system integrators

Software that connects different applications or services, enabling them to communicate or share data (e.g. an API, message brokers).

TRENDS & EMERGING TOOLS IN INSTITUTIONS

Recent research shows increased use of educational technologies such as Learning Management Systems (LMS), web-based tools, interactive mobile tools, and visualization platforms. For example, in higher education institutions like USC, they adopt new software and tools to manage courses, deliver online learning, and analyze learning data.

Open source software in schools has been studied extensively; many case studies exist showing successful adoption in multiple schools, especially to reduce costs and avoid vendor lock-in.

Software developed for educational institutions also includes academic management systems, grading, examination systems, and portals. For example, an "Integrated Educational Management Tool" was developed and tested at Adamson University using open source technologies to automate exam, grading, and student record processes.

Also, in the Philippines, a community college in Northern Mindanao(Northern Bukidnon State College) implemented an e-School system to centralize admissions, record-keeping, and reporting, reducing paperwork and increasing efficiency.

IMPLEMENTATION IN DIFFERENT INSTITUTIONS IN THE COMMUNITY

Education sector (schools, universities)

- Many schools adopt Learning Management Systems (LMS), virtual classrooms, student information systems, and other educational tools. Case studies show successes, challenges, and lessons learned in implementation.
- In the "Open Source Software in Schools" project, several UK schools used open source software to reduce costs and increase flexibility.
- In higher education, digital transformation efforts include adopting cloud infrastructure, integrating software across departments, and leveraging analytics for student performance.

Health / Public health institutions

- Some health systems use open source health management software (e.g. openIMIS) to administer insurance or social protection schemes in poor / rural areas.
- Software and hardware infrastructure in rural clinics may include computers, servers, networking, and database systems to manage patient records, scheduling, and reporting.

IMPLEMENTATION IN DIFFERENT INSTITUTIONS IN THE COMMUNITY

Local government / public administration

- Local government units (LGUs) may adopt systems for revenue collection, permits, record keeping, and citizen services. They require hardware (servers, desktops, networking) and software (information systems, web portals).
- The success of implementation often depends on infrastructure (power, Internet), training, budget, and maintenance.

CHALLENGES IN IMPLEMENTATION

- Resource constraints: many institutions (especially in rural or less-developed areas) lack funding to purchase up-to-date hardware or software licenses.
- Technical capacity & training: staff must be trained to use, maintain, and troubleshoot the systems.
- Compatibility & integration: new systems often must integrate with existing systems or databases.
- Sustainability & maintenance: systems must be maintained over time (software updates, hardware repairs).
- Connectivity / infrastructure: in areas with weak Internet or power issues, cloud-based or Internet-reliant systems may struggle.

ANALYSIS

After researching computer hardware, software, and their implementation in different institutions, I started to see how deeply technology shapes how organizations actually work. Computers aren't just tools for convenience, they've become the foundation of how schools, offices, and even hospitals function every day. But what stood out to me most is that technology isn't perfect or automatic. It demands effort, planning, and knowledge to really make it useful.

Through this topic, I understood that hardware and software are like two halves of the same system. One can't work without the other. But in many cases, institutions struggle to keep them balanced, old computers can't handle new software, and updated systems are wasted on outdated equipment. I realized that it's not just about having technology, but about maintaining it and adapting to changes. Without that, progress stops.

ANALYSIS

Learning about open-source software also gave me a new point of view. It's practical and cost-efficient, especially for schools or offices with tight budgets. But it also shows that technology always comes with trade-offs. While open-source tools save money, they still need experts to manage them properly. Many institutions want to go digital, but they underestimate the importance of maintenance and training. That's why some projects fail even with good intentions. Overall, this research made me realize that technology is not just as something modern or impressive, but as something that requires real commitment. The success of any system depends on how well people handle it, not just on how advanced the machines are. I believe institutions should focus on both upgrading their tools and building the skills of the people who use them. Because in the end, technology doesn't make things better by itself, it's how we apply and sustain it that really matters.

CITATIONS

- “What is Computer Hardware?” — TechTarget, by Rahul Awati & Linda Rosencrance, Oct 6, 2021. TechTarget
- “Computer Hardware, Software, and Networks” — OCO Learn (open textbook). Open Oco
- “Open source software in schools: a case study report” — OSS Watch / Becta (PDF). oss-watch.ac.uk
- Doctor, Anabella C. (2022). Integrated Educational Management Tool for Adamson University (preprint on arXiv). arXiv
- Grepon, B. G. S., Baran, N. T., Gumonan, K. V. C., Martinez, A. L. M., Lacsa, M. L. E. (2021). Designing and Implementing e-School Systems: An Information Systems Approach to School Management of a Community College in Northern Mindanao, Philippines (preprint on arXiv). arXiv

Thank You