

## Project Constraints Essay

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Our Raspberry Pi-based whiteboard capture system is significantly influenced by a number of project constraints that determine which solutions are possible. There are significant economic constraints, as the system is intended to be sufficiently inexpensive for widespread academic use. This requires us to depend on low-cost hardware, open-source software, and a strict component budget. Security and privacy constraints also greatly impact our design, considering the fact that captured whiteboard images can contain sensitive course material that should be viewable only by enrolled students. For this, we would have to provide secure authentication, encrypted data transfer, and protection against unauthorized access or eavesdropping.

Another dimension is the set of ethical constraints: how we record, store, and present instructional content. Professors must retain control over what content is captured and uploaded, and our system must avoid capturing students or personal information that happens to appear in the classroom. There are also environmental constraints since the device will be on for long stretches in a classroom environment and therefore requires energy-efficient components, low heat output, and secure mounting that doesn't damage facilities. This is another reason our choice of a small, low-power Raspberry Pi reduces environmental impact compared to bulkier consumer-grade systems.

Finally, professional considerations demand that our team employ good software engineering practices, documentation, and testing such that the system reflects well on us as future engineers. The project will be a reflection of our technical competencies, so we must design a solution which is reliable, maintainable, and ethically responsible. Together, these constraints guide the project to a solution that is secure, affordable, professionally built, and suitable for educational environments.