

A Disciplinary Research Collaboration

SCC Arcade: A Picade Cabinet to Showcase Student-Made Games

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1. Executive Summary

This project set out to build and set up a Picade arcade cabinet, running an emulation system on a Raspberry Pi, so that games made by students, including their final-year graduation projects, could be showcased and played on a dedicated physical machine at university events. We first studied an existing arcade machine, then learned the hardware and software at home using Raspberry Pi boards provided to us, before assembling the cabinet and installing the system across a series of regular meetings. The cabinet was successfully assembled and boots, but the final input configuration could not be completed because of a faulty joystick component that appears to have arrived damaged. The project is therefore currently under development, pending a replacement part before student games can be loaded and displayed on it as a reusable showcase platform.

2. Background and Aims

Background: The university wanted a way to physically showcase student-made games at events, giving students first-hand exposure to how games are presented and experienced on real arcade hardware. One of the specific motivations was to give students a place to present their final-year graduation project games, both to display their work and to let it be played by other students and visitors at university and open day events. The cabinet was intended not as a one-off build but as reusable, ongoing infrastructure that could support future modules and student projects and help engage prospective students during open days and outreach. An arcade machine already existed but ran on a completely different setup (an older Mac with an emulator), so a new, self-contained cabinet built around a Raspberry Pi was proposed. For one of us this was a first experience with this kind of hardware, while the other had some background in it.

Aims: To build a working Picade arcade cabinet, running an emulation front-end, capable of displaying and running student games, including final-year graduation projects, and to establish it as a reusable platform for showcasing student work at university and open day events.

Objectives:

- Study the existing arcade machine to understand how such a setup works.
- Learn the hardware and software independently using Raspberry Pi boards provided for home use.
- Assemble the Picade cabinet.
- Install and configure the operating system and emulation software.
- Get student games running on the finished machine.
- Explore designing and building our own custom version of the cabinet, beyond the off-the-shelf kit.

For the student partners, the project was also an opportunity to build practical hardware and systems knowledge that complements our games-development studies and gives us a fuller picture of how games are delivered on physical platforms.

3. Methods

We began by examining an existing arcade machine to understand its build and how its software was configured. The project leads then provided us with Raspberry Pi boards to take home, so we could set the system up ourselves and become familiar with the process before working on the real hardware. We arranged regular meetings to build the cabinet together, focusing first on the internal system (the Raspberry Pi) and then on the physical assembly. Progress and problems were discussed as a team as we went, with tasks worked on between meetings.

4. Results

The cabinet was physically assembled: the components were put together, the screen was mounted and connected, and the joystick and buttons were wired in. However, the Raspberry Pi supplied was a newer model (Pi 5) for which the intended emulation system (RetroPie) had no compatible build, so the standard installation could not complete. After researching alternatives across several forums and trying a number of approaches, we installed another system that ran successfully (RecalBox). Once the hardware was assembled and the system was ready, the machine booted successfully.

The remaining step, assigning the joystick directions and buttons in the input configuration, could not be completed. The joystick registered only the “up” direction, with no left, right or down. Despite repeated attempts and reinstalling the system, the issue could not be resolved. We traced the cause to a bent metal pin on the joystick’s connecting cable, noticed when the part was unboxed; although we carefully straightened and reseated it, the component appears to have been faulty on arrival. Work was paused at this point, pending a replacement joystick.



5. Discussion

Measured against the aim of producing a working cabinet, the project reached the point of a fully assembled, booting machine, with only the input configuration outstanding, so a large part of the groundwork is in place. What went well was assembling the cabinet, learning an unfamiliar hardware and emulation pipeline, and problem-solving the Pi 5 compatibility issue by finding a working alternative operating system. The main limitation was outside our control: a hardware fault in the supplied joystick blocked the final step. Time was also a constraint; balancing the project against part-time work, coursework and the summer break meant progress was slower than planned. A more structured plan with milestones would have helped the team stay on top of the work throughout.

6. Conclusion and Future Work

The cabinet is assembled and running, and is currently under development pending a replacement joystick. The immediate next steps are to obtain and fit a working joystick, complete the input configuration, and load student games onto the machine so it can be used at events. Beyond that, once the build is proven end to end, the cabinet can serve as ongoing, reusable infrastructure for showcasing student games at teaching activities, showcases and open day events, as originally intended. A second objective was to design and build our own custom version of the cabinet; due to time constraints and other commitments, we were not able to progress this part of the project much, and it remains a direction for future work.

7. Lessons Learned

We gained hands-on experience with arcade hardware and emulation software, which for one of us was an entirely new area. We learned to troubleshoot operating-system compatibility problems and to research and test alternative solutions when the standard route failed. A practical lesson was the value of carefully inspecting parts on arrival, as a small hardware fault can hold up an otherwise finished build. Working in a mixed student and staff partnership also gave us insight into coordinating a longer-running practical project alongside our studies.

8. Group Reflection

Regular meetings worked well and kept the build moving when we were able to meet. The main difficulty was time: competing commitments (part-time work, coursework and the summer break) meant the project had to be paused for a while and progress was slower than planned. What would help next time is setting a simple plan with milestones and regular check-ins from the start, so the project keeps moving even during busier periods.

References

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