Situated Learning in Systems-Level Coursework

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Abstract

'Reptilian': a custom OS distribution.

· Built on **Linux kernel** (authentic experience)
· Incorporates **Android** to connect to daily life
· Bundles **Ubuntu** for robust toolset

This work builds on prior educational operating systems platforms and research into Linux-based systems curricula.

Background

Authenticity and Situated Learning

· Authenticity aligns learning with student goals[1]
· Situated learning connects to student daily life[2]

Educational Operating Systems

· Scaffolding supports learning for students[3]
· Prior OSs eased students into systems dev.[4]

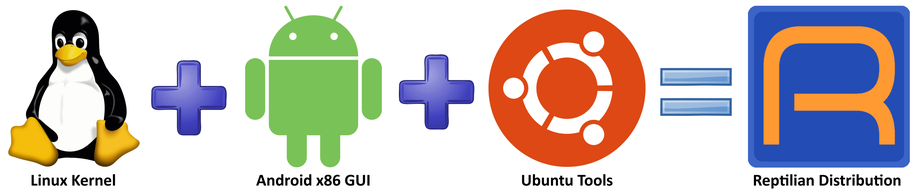
Linux in Systems Coursework

· Traditional distros are authentic, but heavy[5]
· Android distros are lightweight, but lack tools[6]

Reptilian Operating System Distribution

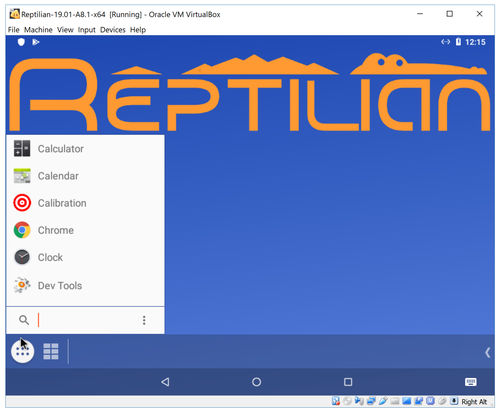
Architecture

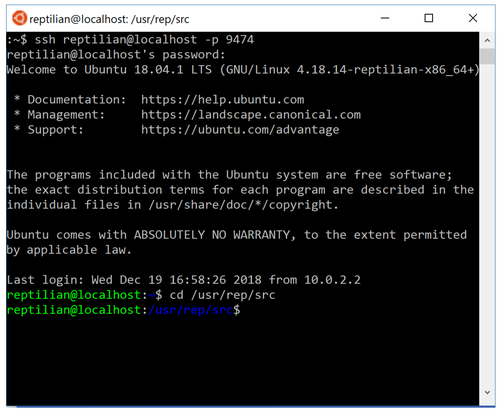
Reptilian is a **hybrid Linux OS** combining common desktop toolchains & the Android GUI.



Features

· Distributed as an **import-and-use** open virtual appliance file (OVA)
· Complete, **configured suite of tools** to compile & install Linux kernel
· Kernel configuration **tailored for faster compilation** within VM
· **Network-ready** out-of-the-box (SSH / remote debugging)





Perceptions Study

Context

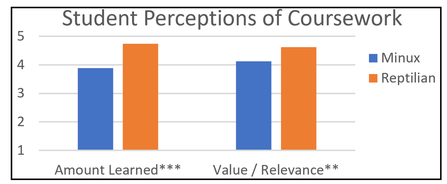
· Control group: Minix
· Intervention: Reptilian
· 409 undergrad. students
· One instructor, 2 classes

Survey Questions

· Amount learned
· Amount of effort
· Difficulty of content
· Value / relevance

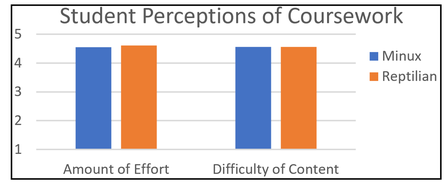
Findings

Students using Reptilian **rated their learning higher** and **considered the coursework relevant** more often than those in the Minix cohort.



"Clearly useful for CS students, particularly the projects which have students directly edit the Linux kernel. This is a real (and marketable) skill."

However, there were no statistically significant differences in student ratings of how much effort they put in or perceptions of the **difficulty of the work**.



Takeaway

Contextualizing systems coursework with authentic and personal connections impacts student perceptions and has implications in for how we teach students.

References

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