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FREE SOFTWARE AND FREE CULTURE IN HIGHER EDUCATION: PIPELINES AND WORKFLOWS FOR CREATIVE PURPOSES

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Abstract

OpenLab ESEV is a project of the School of Education of the Polytechnic Institute of Viseu (ESEV), Portugal, that aims to promote, foster and support the use of Free/Libre Software and Open Source Software, Open Educational Resources, Free Culture, Free file formats and more flexible copyright licenses for creative and educational purposes in the ESEV's domains of activity (education, arts, media). Most of the OpenLab ESEV activities are related to the teacher education and arts and multimedia programs, with a special focus on the later.

In this paper, the project and some activities are presented, starting with its origins and its conceptual framework. The presented overview is intended as background for the examination of the use of Free/Libre Software and Free Culture in educational settings, specially at the higher education level, and for creative purposes. The activities developed with students and professionals generated pipelines and workflows implemented for different creative purposes, software packages used for different tasks, choices for file formats and copyright licenses. Finished and ongoing multimedia and arts projects will be presented as real case scenarios.

Keywords: Free software, free culture, higher education, arts and multimedia.

1 THE OPENLAB

OpenLab ESEV is a project of the School of Education of the Polytechnic Institute of Viseu (ESEV), Portugal, that aims to promote, foster and support the use of Free/Libre Software [1], and Open Source Software [2], Open Educational Resources [3], Free Culture [4], Free file formats and more flexible copyright licenses for creative and educational purposes in the ESEV's domains of activity (education, arts, media).

ESEV is located in Viseu, a city in the northern-center of Portugal. The School was founded in 1983 as a teacher education institution but has diversified its activities. Currently, it has over 1500 students and 105 teachers and offers nine undergraduate and 13 Master's programs, most of them related to Education (i.e. teacher education, environmental education) but also including Cultural Animation, Plastic Arts and Multimedia, Sports, and Advertising and Public Relations. Most of the OpenLab ESEV activities are related to the teacher education and arts and multimedia programs, with a special focus on the later.

Although the project officially started in 2009, some connected activities happened earlier. The staff members involved had already discussed the residual presence and knowledge of Free Software and Free Culture in ESEV's culture and activities. The project emerged to aggregate some initiatives developed by its members during that period. It aimed at establishing a more tangible and persistent presence that could support and foster the use of F/LOSS, Free Culture and more flexible licenses for creative and educational purposes. Previous research was pivotal in understanding the situation in the school: unlicensed software, almost total lack of knowledge of the existing Libre alternatives and work habits exclusively based on proprietary software [5]. Currently, OpenLab is sustained by a core group of four teachers working on a voluntary basis. This group acts as a hub in a transient network that includes students, teachers, former students and other actors not directly connected to the School.

In this paper, the project and some activities are presented, starting with its origins and its conceptual framework. The presented overview is intended as background for the examination of the use of Free/Libre Software and Free Culture in educational settings, specially at the higher education level, and for creative purposes, since "Free art and a free culture, is of vital importance for a free society" [6] (p. 311) and "Issues surrounding copyright and free access are among the most divisive and most important of the digital age, bringing into the open questions about the nature of knowledge, of content, of society, identity and democracy" [7] (p. 6). The purpose is to further the discussion about Free/Libre Software and Free Culture as ethical and valid choices that stand for the digital commons,

an ecosystem based on the free exchange of ideas and creativity, on freedom and sharing, offering and expressing a choice outside overly-restrictive traditional copyright and established or more conventional methodologies of production based on proprietary software [8].

Going beyond the desire to promote informed choices as the motivating challenge that emerged from an environment characterized by the lack of knowledge of the existing Free/Libre alternatives and by work habits exclusively built around proprietary software, the authors share the view that “The decision to work with free software is also an ethical decision, the expression of a desire to live in a world organized in a different way, where the artificial barriers that benefit only a few are eliminated” [9] (p.16). In the context of the arts and multimedia, this also means realizing that “Free software (...) brings with it powerful new production methods and vibrant communities, which challenge artists to change the ways things of all kinds are made” [10] (p. 248), and that “the workflow in f/loss is not pre-determined for the artist (...) and opens a world of possibilities and creativity” [11] (p. 42).

2 OPEN LAB ACTIVITIES

Since its inception in 2009, OpenLab ESEV elected four key areas of action: dissemination, training, support and production. The first three are mainly focused on the school and local community and the last one extends the scope to a participation in a wider landscape.

The several activities developed with students and professionals generated pipelines and workflows implemented for different creative purposes, software packages used for different tasks, choices for file formats and copyright licenses. Finished and ongoing multimedia and arts projects are presented as real case scenarios. These projects are developed in the program, in the last semester, with the supervision of two teachers: one more focused on the artistic dimension and the other on the multimedia. During the semester, students combine the development of their project with other courses. From the 30 ECTS of the semester, 11 are dedicated to the project. Students elect their topic and develop their ideas and products. Since 2010, OpenLab supported 49 projects out of close to 200. Twenty were a 3D short animation, developed individually by the students. This means they were responsible for the design and production of the shorts. Other projects with a clear close relation to 3D were four 3D interactive virtual environments.

2.1 Pipelines and workflows for creative purposes

Students can choose the software and contents they work with in their projects. Part of the development of the project are decisions regarding the software, licenses, and file formats they will work with. Guidance and support is available for all options. The supervision and support processes focus, therefore, the establishment of the necessary pipelines and workflows. We use pipeline to describe the chain of software packages connected and arranged in a sequence and workflow to identify the set of tasks involved in making a 3D animation short, orchestrated in four stages: pre-production, production, post-production and distribution. Next, we present and comment pipelines and workflows established for the students' projects.

2.1.1 Infrastructure

Softwares and decisions related to supporting the process before the conception of the short begins. In terms of operating system, three OS were used: Mac OS, Windows and GNU/Linux. Since most students were accustomed to proprietary OS, that was respected since a change would entail adaptation. But the projects were partially developed in the OpenLab room which only had computers with GNU/Linux. Students were able to use those computers without significant difficulties. Seven students went a step ahead and installed GNU/Linux OS in their laptops, namely Ubuntu. A change in OS is usually associated to a change in working habits, so this preponderance of proprietary OS is not a surprise and enforces the need to diversify the experience with operating systems in the training so students are comfortable with any choice.

Project management softwares are also part of the infrastructure. Being individual projects, and with little experience in the use of these softwares, there was some resistance to their use. Nevertheless, all students experimented using Planner, an open source project management system. Also, because it is cross-platform, meaning it is available to all OS. Some students tried Trello, a web-platform, proprietary. Resistance to its employment was the same and it was abandoned.

More specific management solutions were tried, specially since options targeted to movie production were available. Two softwares were employed, one developed by OpenLab and one developed in

collaboration with the Technical University of Darmstad. Shotz is a web-based task manager for animation and VFX projects, developed to support students' short movies production management. Tindio is a production and workflow management platform for film and VFX projects. Although more successful in terms of students usage, both were only moderately employed in the projects. Both softwares are available on-line with open source licenses: Shotz on <https://github.com/nafergo/shotz> and Tindio on <https://github.com/e-pool-productions/tindio>.

For movie playback software, necessary for previews during production, two options were experimented: DJV Imaging and VLC, both open source cross platform. In spite of presenting less features, VLC was chosen over DJV Imaging. The option was based on more familiarity with VLC. Again an argument for diversity of softwares throughout the training.

2.1.2 Pre-production

For pre-production, three main tasks are highlighted: script writing, storyboard development and concept art creation.

For script writing, several free softwares were experimented: LibreOffice, which is a general word processor; Celtx and Trelby, which are specific for script writing; and SAWP (Fig. 1), a web-based script writing authoring platform developed by OpenLab in collaboration with the Technical University of Darmstad. This is available on <https://github.com/Screenwriting-authoring-web-platform/sawp>. Libre Office was the most employed. Again, because students were more comfortable with it but also because the script writing was a task rushed through not creating the need for a more specific, feature-rich solution.



Fig. 1: Frame from project based on a script developed in SAWP, by J. Salgueiro, in 2015.

For storyboarding and concept art, GIMP, MyPaint and Krita were employed. The three are free software. Although some experiences were made with these softwares, Adobe Photoshop – the more familiar, comfortable tool – was preferred. Two students who had used GIMP before the project, chose to use it. MyPaint and Krita (Fig. 2) were used in exclusivity by two projects, in different years. The students didn't know the softwares before the project but after experimenting with it decide to use them. Being specific for digital painting, MyPaint and Krita flowed into the two students creative process. These students had a strong background and interest in drawing and illustration and enjoyed the features and workflow of the softwares. Both work, currently, in the area.



Fig. 2: Frame of project created with Krita, by C. Rolo, in 2012.

2.1.3 Production

Production of a 3D animation short includes modelling, rigging, layout, animation, shading (including texturing), lighting, and rendering. Blender was a crucial tool for all these tasks, in all the projects. In the semester before the project, students have a course on 3D Animation (4 ects) where Blender is introduced (Fig. 3). Even with a short previous experience with Autodesk Maya (3rd semester of program), students were more knowledgeable of Blender as a 3D software. Blender is a free and open source 3D computer graphics software used for creating animated films, VFX, architecture visualization, interactive 3D applications, video games, and 3D art in general.



Fig. 3: Frame from project developed in the course on 3D Animation, by J. Salgueiro, in 2014.

For modelling, besides using Blender to create their own models, students occasionally used MakeHuman and resorted to Blendswap. This is a web-platform where Blender artists share their creations under Creative Commons licenses, available on <http://www.blendswap.com/>.

Blender was the software that supported every student in the steps and tasks related to rigging, layout, animation, shading and lighting. For texturing (Fig. 4 and Fig. 5), GIMP and/or Adobe Photoshop were used. The choice between the two was based on students previous experience.



Fig. 4: Frame from project showing texturing, by D. Rocha, in 2015.



Fig. 5: Frame from project showing texturing, by T. Luzio, in 2015.

Finally, for rendering, projects until 2012 used Blender's Internal Render engine while projects from 2012 preferred Blender Cycles. This had to do with the development of Cycles and its integration in Blender from 2011. Associated with rendering, several projects needed to use a renderfarm, or a computer network created to distribute the rendering of computer generated images. For this, several solutions were used, in different years for different projects. Blender Network Render, Blender's by default renderfarm, and Loki Render were used to connect local machines. Managing those networks

proved too time consuming and different solutions were employed: renderfarm.fi and SheepIt, both web-based. Both allow students to manage their rendering from their laptop, according to their own times and needs. Relying on the school's network didn't allow that as computers needed to be used for classes during school days.

2.1.4 Post-production

Finally, three steps from post-production are highlighted: compositing, audio and video editing. Three different free software were used for compositing (Fig. 6 and Fig. 7), in different projects. Blender was used in all of them. Natron and ButtleOFX were experimented but not adopted. Blender has strong compositing features and managing this step in the same software as production avoided export/import tasks.

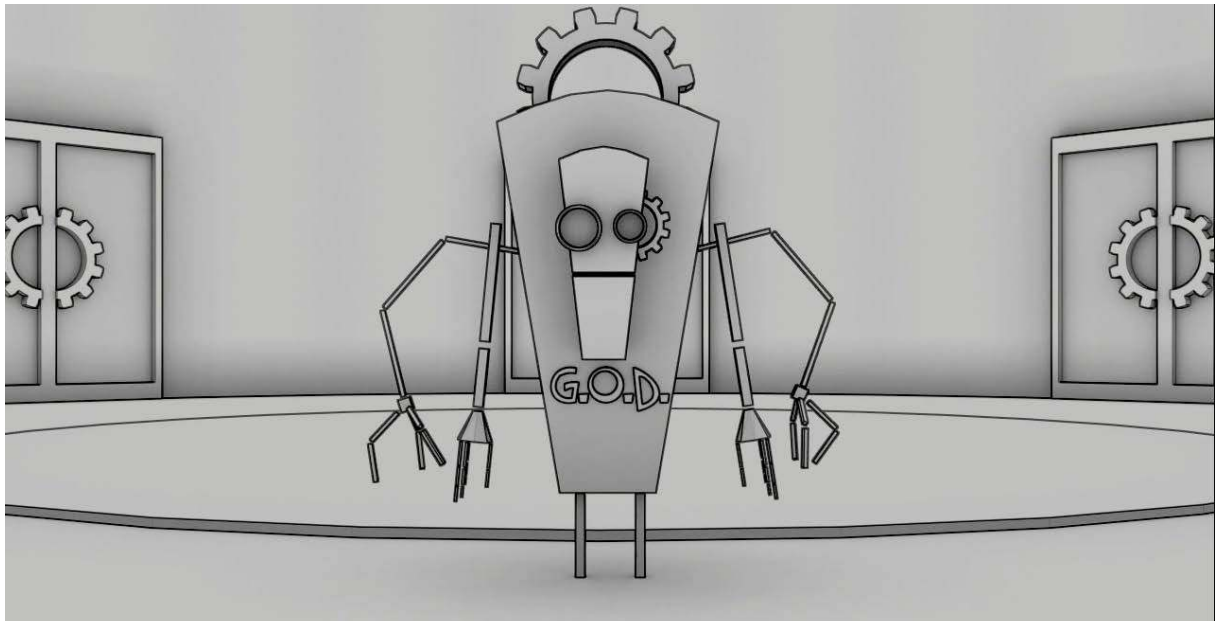


Fig. 6: Frame from project showing stylized render created by compositing, by F. Oliveira, in 2011.

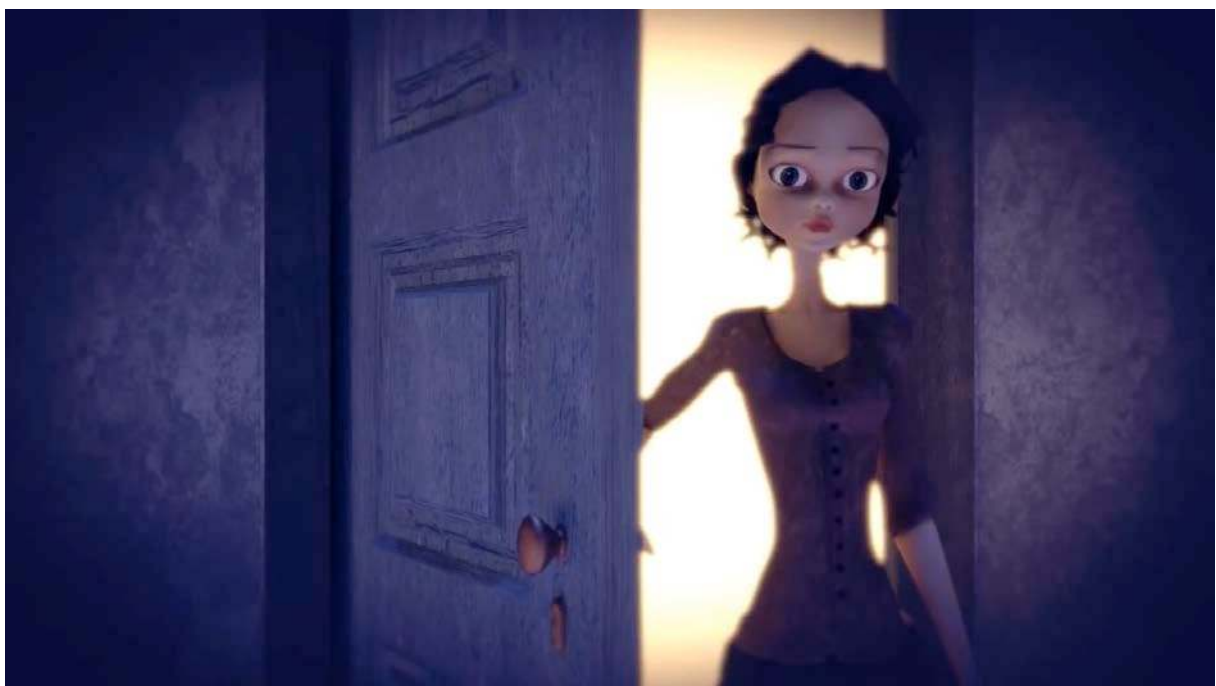


Fig. 7: Frame from project showing light and colours manipulation through compositing, by M. Ruas, in 2014.

For audio editing, both Audacity, free software, and Adobe Audition were employed. Again, students familiarity with Audition justifies its integration in the workflows but five projects relied exclusively on Audacity. For video editing, a similar scenario: students experience with Adobe Premiere dictated that projects were mainly edited with it. Eight students preferred to use Blender to do the video editing.

Audio and video editing are competences developed in previous courses in the program. In those courses, students learn to edit with proprietary software and so, when they need to use those competences in their final project, they resort to those tools. Still, in both cases, students were capable of applying their knowledge and skills with different software, freeing themselves and their competences from a specific tool of production.

2.1.5 Distribution

Every short was released with a Creative Commons license and are available online in video sharing websites like YouTube or Vimeo.

2.2 Future and recommendations

The immediate relevance of the tools seemed to matter to the way students adopted them. Modeling and animating are core to the work developed but scriptwriting and managing were seen as peripheral. Software related to these tasks was experimented but not fully integrated into the work habits. Being free/open source or proprietary didn't seem to make a difference. For tasks whose relevance was unquestionable, familiarity and comfort with using the tools proved to have weight in the way students chose the software. This has more to do with previous experience, than with software features. When presented with new software, easier and simpler options were preferred over more complex and feature-rich ones. Again, being free or proprietary didn't seem to be the critical feature.

Most of the students revealed themselves as somewhat conservative in their software choices, staying in their comfort zone. On the other hand, some students showed a notable competence to adapt to new tools and even develop mastery skills in a short period of time.

A strong recommendation for training emerges pertaining to the need to detach technical and artistic skills from specific software. A stronger, deeper focus on building competences should be connected: to the familiarization with different tools, and to the development of a critical stance, supporting the analysis of software with different criteria: features, software pipeline integration, ethical, industry standards, etc. These are required from any professional about his/hers production tools.

The experience has been, so far, with individual 3D animations developed by students in the context of courses in their programs, therefore subject to assessment. Other contexts of use are important to evaluate the workflows and pipelines. Two main options are being pursued: group projects in courses, still under the influence of assessment, and projects developed outside the course work by students interested in deepening their skills or being closer to a studio production experience. A focus is on the project and production management software and on the pre-production tools that have been developed and not yet fully tested. Broadening the focus to include VFX and/or 2D animation would also allow a larger development of solutions and a richer discussions about free software and free culture.

We are currently exploring how to share our experience and knowledge with practitioners, teachers and students in a more practical and useful manner at Libre Pipeline for Animation, available on <http://librepipeline.animaxionstudios.com/>. This is an online directory with links to Free/Libre and Open Source Software and resources or assets (3D models, photos, HDR1, sounds, etc.) that you can use in an animation movie production.

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