

**COMPARATIVE STUDY OF FREE SOFTWARE AND FREWARE FOR
VIDEO EDITING
ESTUDIO COMPARATIVO DE SOFTWARE LIBRES Y SOFTWARE GRATUITOS PARA
LA EDICIÓN DE VIDEO**

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Manuscript information:

Received/Recibido: 12/08/2022

Reviewed/Revisado: 14/09/2022

Accepted/Aceptado: 03/09/2023

ABSTRACT

Keywords:

edition, free software, freeware,
communication, benchmarking.

A comparative study of video editing software was carried out, with the premise that they were free software or freeware. A Benchmarking study was made, taking as reference those considered up to now as the best of its kind, Da Vinci Resolve and Hitfilm Express. To select the rest of the software, an investigation was made in the literature and the Internet. When software with potential was found, we passed it through selection filters, which allowed us to reach the programs we were looking for for our research, these were Kdenlive and Shotcut. We were subjecting the selected programs, along with the reference programs, to different questionnaires and tests. Each program obtained a score, and the comparative study was made. The results indicated that, in general terms, free software was on par with the referents, even in some items, such as formats and codecs, higher. We conclude that, with the particularities of each program, which privilege some features over others, any of the four programs that we finally analyzed is worthy of being considered an excellent video editor. In addition, software can be considered cultural assets of this new digital age. They are part of the new media, which must be observed with new paradigms. The current of free software could be taken as one of the new communication paradigms to analyze the new reality.

RESUMEN

Palabras clave:

edición, software libre, software
gratuito, comunicación,
benchmarking.

Se realizó un estudio comparativo de software de edición de video, con la premisa de que fueran software libres o software gratuitos. Se hizo un estudio de Benchmarking, tomando como referencia los considerados hasta el momento como los mejores de su clase, Da Vinci Resolve y Hitfilm Express. Para seleccionar al resto de los software se hizo una investigación en bibliografía e Internet. Cuando se encontraron software con potencialidad, los pasamos por filtros de selección, que nos permitieron llegar a los programas que estábamos buscando para nuestra investigación, estos fueron Kdenlive y Shotcut. Sometimos los programas seleccionados, junto a los de referencia, a diferentes cuestionarios y test. Cada programa obtuvo un puntaje, y se hizo el estudio comparativo. Los resultados indicaron que, en términos generales, los software libres estaban a la par de los referentes, incluso en algunos ítems, como formatos y

códecs, por encima. Concluimos que, con las particularidades de cada programa, que privilegian algunas características por sobre otras, cualquiera de los cuatro programas que finalmente analizamos es digno de considerárselo un excelente editor de video. Además, los software pueden considerarse bienes culturales de esta nueva era digital. Forman parte de los nuevos medios de comunicación, los cuales se deben observar con nuevos paradigmas. La corriente del software libre podría tomarse como uno de los nuevos paradigmas de Comunicación para analizar la nueva realidad.

Introduction

The problem that was addressed was to have the possibility of editing video, with free or open source software, without having to pay for expensive licenses. Whether in the educational or professional field. What we did was to determine the most appropriate software and draw conclusions according to the results of the comparative study. Many times for editing there is an attachment to certain proprietary software. This study aims to provide a quality solution, both professionally and academically, to manage different alternatives. I understand that in editing the most important thing is the theory and its practical application, at the service of what is being told.

With the expansion of ICTs and the reduction in the cost of filming equipment, we are facing the democratization of audiovisual production. This research dealt with access to media at the post-production stage. New technologies have made it possible to move from the consumer to the prosumer, who creates content. But is all creation good?

The overall objective of the research was to compare the best free video editing software with the best free ones. To this end, a series of specific objectives were achieved. The first specific objective was to define essential concepts and categories of analysis such as: assembly and editing, free software, licenses, copyrights, benchmarking, new communication paradigms, and variables.

The second specific objective was to identify free video editing software, and free software, valid for the Windows operating system. Hitfilm and Da Vinci Resolve have freeware versions, proprietary programs made available to users at no cost. Their free versions are very good editors and the ones we took as a reference for being considered, prior to the research, as the best of their kind. On the other hand, among the free software, some with potential were selected.

For the third specific objective, filters were used to find the most appropriate software for professional editing, these were:

1. Work and export in Full HD quality, 1920 x 1080 pixels.
2. When working in the program, there are no limitations in the basic or advanced functions necessary for editing, and to overcome them, it is necessary to access the paid version of the program.
3. The professional environment or interface was another pre-selection criterion.
4. The high learning curve of the software was another reason to discard it.
5. We added a fifth filter of professional video and sound tools.

The ones that passed these filters, out of all the selected software, were Shotcut and Kdenlive. In the fourth specific objective, the selected software was evaluated, analyzed and compared. In the fifth specific objective, the selected software was classified, according to its characteristics and utilities, for the audiovisual editing and post-production stage.

Editing and Editing

With technological advances, video cameras appear, and a new concept and way of proceeding is introduced, the film is no longer mounted one on top of the other, but edited. The analog linear video editing island worked by playing back the contents of a magnetic tape cassette and recording it onto another cassette. While a video player played back what was filmed, a video recorder recorded the selected fragment. The first was the player, which played back the content that had been shot, the second was the recorder, which recorded the selected shot.

Taking this analogical model of operation, the interface and distribution of the elements in the digital computer editors is developed, in which the order of the chosen

planes can be altered very easily, this is called non-linear editing. Murch (2003) said in 1995 that future home computers will be the envy of the professionals of their time because they will be able to do everything, and he was right. Today computers are much more powerful than the old analog editing islands.

Operating Systems and Software

Operating systems allow the user to communicate with the computer. Windows or Linux operating systems can be installed on any computer. Linux is free and Windows is paid. Macintosh has its own Mac OS operating system. The research was conducted on the Windows operating system. For further research purposes, we also indicate whether the analyzed programs work on the other operating systems.

Proprietary software is software that you must pay to use. In this study we will not deal with this type of software. Cascante (2013) mentions that in the case of proprietary software there is no access to the software algorithms, its operation is unknown and therefore it can be potentially unsafe for the user. He also mentions that there is an oligopoly of software companies and its high cost makes it difficult for developing countries to afford.

Freeware belongs to private companies that make it available to the public for use at no cost. These programs keep the source code private.

It should be noted that free software is not the same as open source software. Richard Stallman referent and promoter of the Free Software movement mentions that free software to be free must have 4 fundamental truths "we refer to the freedom of users to run, copy, distribute, study, change and improve the software". (Stallman, 2004, p. 45)

1-Freedom to run the program.

2-Freedom to study and adapt the program, access to the source code is essential.

3-Freedom to distribute copies and help.

4-Freedom to improve the program and then publish it for the good of the whole community.

A fundamental concept in free software is that it is not a matter of free of charge, it is a matter of freedom. Stallman (2004) adds that it is good not to depend on large software corporations in order to be free. And that free software is becoming more and more accepted. In addition, the common user can hire a programmer to improve the software, fix bugs or add functionality. Cascante (2013) mentions that NASA, Google and Amazon use free software, and movies such as Avatar, Toy Story, Shrek were also made with free software.

Copyrights

Copyright is one of the rights in the Universal Declaration of Human Rights. On the official website of the World Intellectual Property Organization we see that:

In legal terminology, the term "copyright" is used to describe the rights of creators over their literary and artistic works. Works that lend themselves to copyright protection range from books, music, paintings, sculpture and films to computer programs, databases, advertisements, maps and technical drawings. (WIPO, 2022)

The rights of literary works, films and computer programs, among others, are protected. A script, an edited movie, and editing programs can be protected. The economic and moral rights of the work are protected. Free and open source software allows access to media without violating copyright issues. The right to education is a human right, so I think it is very appropriate to apply free software in education, to guarantee access to computer tools.

Piracy

Piracy touches on several issues: the digital divide, access to media, democratization, copyright and intellectual property, among others. This work proposes an alternative to piracy, using legal software. Free software depends on the goodwill of the private company, while free software emancipates even more because it has a collaborative and solidary spirit. With these two types of software there are no problems of illegality in case of not having the license.

Licenses

Licenses are one of the variables to be studied, the subject is complex since there are several types of licenses. The license is a contract in which the user is allowed to use the software; and to modify, copy and distribute in the case of free licenses. In our work we will see which type of license each selected program belongs to. On the WIPO website (2022) we see that: "For the purposes of copyright, computer programs and other types of software are *software* are considered literary works." The types of software licenses are basically divided into two parts, on the one hand the licenses that belong to proprietary software and on the other hand those that belong to free software.

In Bugna and Friss's work by Kereki (2017) we see that proprietary-type licenses include all types of nonfree licenses. Within the privative ones in our work we are interested in the *Freeware* category, it is the software that belongs to companies that make it available to the user for its use. But it cannot be modified, since its source code is not available.

On the other hand Moreno (2015) points out that *free software* gives freedom to the user, because by leaving the code open source it is shared and collaborated with others. Free software goes beyond the fact that it is free, it promotes values of freedom and cooperation. "When we talk about free software, we are referring to freedom, not price." (Stallman, p. 206) Copyrighted software places limits on the user in that the user cannot copy, distribute or modify the program.

But even copyleft is guaranteed through copyright. Therefore, the copyright is very important, since it gives guarantees to the copyleft that the conditions of the license are fulfilled. Copyleft is registered with copyright, allowing you to copy, distribute, or modify, but establishing as a condition that when you modify the program you are obliged to keep the result also free, and you can copy, distribute and modify it. GPL (GNU General Public License or GPL-GNU) was created by the Free Software Foundation. "We protect your rights through a combination of two measures: (1) we place the software under copyright and (2) we offer you this license, which gives you legal permission to copy, distribute and/or modify the software." (Stallman, p.207)

Comparative Study. Benchmarking

Benchmarking is a process of studying the best practices and/or products of an industry, internal or external, in order to implement and incorporate improvements, adapting them to the qualities of the organization or product itself. Of the phases of the benchmarking method proposed by Robert Camp, a reference on the subject, (Hernández and Cano, 2017), we use only the first two phases, Planning and Analysis. Plan what we are going to study, how we are going to do it and how we are going to collect the data. We then analyze these results to reach conclusions.

Spendolini (1992) in his text gives a range of possibilities to define Benchmarking, as there are many opinions in the discipline. Using these possibilities, and adapting them to our study, the definition we use is the following: "It is an analytical and continuous process of comparing the products, services and work processes of Companies or Organizations that are recognized as best in class for the purpose of organizational

benchmarking." HitFilm Express and Da Vinci Resolve, which have free versions, are the benchmark or model to follow. These programs were chosen as the models to be followed since, prior to this research, they were used in a satisfactory manner, obtaining quality audiovisual products. The same did not happen with free software, which prior to this research presented some inconveniences in some functions.

New Communication Paradigms

The Internet and new technologies have been key to the development of a new reality, which must be reviewed with new paradigms. The old paradigms are obsolete. Today, the average user can produce content for networks and publish it to reach many people. Unthinkable in the classic paradigms of communication, where media communication was unidirectional. Understanding this new reality requires new paradigms. Eduardo Ruiz mentions in his work on Serrano and Barbero, and the theory of mediations that: "Every social process, especially communication, is not linear or direct, it is mediated" (Ruiz, 2004).

In the case of new media, communication is computer-mediated. A standard user can edit audiovisual material and upload it to the network. Today the network is full of audiovisual material created by users, with different levels of technical quality and content. Gómez (2017) says that the personal computer appears as a protagonist in reading and audiovisual creation, art, music, video, video games and animation. Mascarell (2016) comments that cell phones have democratized the world of audiovisual production, more than video cameras did. With the cell phone you can obtain material to be edited later on a laptop with better editing options than the cell phone.

The theories of Emirec and Prosumers are two opposing positions, Aparici and García Marín (2018) comment that they are usually taken as synonyms, but they are opposite concepts. The Prosumer is shown as an alienated and functional subject to the system that produces free content in his free time. While the Emirec, (sender and receiver), is an empowered subject who has a critical eye. Emirec communicates from a position of freedom.

Scolari (2017) manifests the need to observe the reality of communication and new media with new paradigms. He alludes that some of the known paradigms are already obsolete, and I agree with his view. He names Lev Manovich, which I took as a theoretical framework, because it provides an important perspective for the present research, and it fits like a glove.

Lev Manovich

In his book "Software takes over", Manovich (2008) mentions the importance of software in today's society, he says that it is present in almost everything, and there is a gear to make technology and devices compatible with each other. However, the software remains invisible to communication theorists. There is talk of the Internet and new media, but the software that underlies all these new paradigms has not been paid attention to.

He also points out that Open Source movements are the exception, this movement has stopped to think about this and copyright issues. To which I add that there is also the Free Software movement, which is different from the Open Source movement. Manovich (2008) indicates that in order to study new media, one must study computers and software, and learn about the reality within them. It uses the term cultural software to refer to content creation and distribution software. An editing software would fall into this category of cultural software.

He adds that contemporary society can be categorized as a software society, where software takes a central role in culture. He states that reading the source code of the

program does not help, i.e. it is not about studying the software from a computer science point of view or the way the code is written. The free software current expresses another idea in this regard. For the free software movement it is essential to have access to the source code as it gives freedom to the user. It is good to see two different, and opposing, points of view on the same issue.

In another of his books, "The Language of New Media", Manovich (2006), says that new media, Internet, websites, multimedia or video games, have the computer in common. It is also used as a tool for the production, distribution and exhibition of content. Today, communication is mediated by the computer. Today's media are reduced to numerical data, zeros and ones, which are processed by the computer, be it graphics, sound, videos, texts, etc. By means of mathematical calculations and algorithms, noise can be removed from a photograph. He stresses that new media require a new stage in theory. To understand them, one must pay attention to computer science, and move from media theory to software theory.

José Luis Orihuela

Orihuela (2002) in his article refers to the fact that the Internet has overturned the paradigms that previously helped us to understand the mass media. He systematizes ten new paradigms with the changes that emerge in the network and give rise to what he calls e-communication. His thinking is in line with what Scolari mentions about the need for new paradigms to interpret the current situation. Due to the Internet and new technologies, society has been changing. Although Orihuela never mentions software, these new paradigms allow us to place ourselves in the context of this new reality. The Internet brings together all the media, it is a new medium, and it made the old media redefine their identity. Internet with its multimedia format claims audiovisual production. The videos are present on the web, film, television, press, radio, forums and social networks. To produce audiovisual content there are the software that we will analyze.

Richard Stallman

If I consider Lev Manovich's point, to see software as a new medium, then I can take Stallman's free software current as a current or paradigm within communication. Free software does not only refer to a question of price or gratuity, but of freedom, and that possibility of emancipation is what, in my opinion, determines the free software current as a paradigm of communication.

Free software is respectful of copyright issues. It promotes democratization, values of solidarity and access to new media, mainly in developing countries. Undoubtedly, free software has several advantages over freeware. When free software reaches a high level of quality, it benefits many people, it remains as a collective good and does not depend on any particular software.

Variables

In the study we looked at a number of variables that we analyzed to compare the software, here are some of them: *Resolution*. The most commonly used are Full HD, 4K and 8K. Full HD was the reference we took. *Codecs*. Codecs(*video compression*) are programs for encoding and decoding audio and video files to reduce their size. Codecs use algorithms to compress digital video and audio information, reducing their size to facilitate transmission and storage. Examples of codecs: H264, MPEG4, WMV, H265.

Formats. The amount of information is determined by the resolution, i.e. the horizontal and vertical dimensions expressed in pixels, e.g. Full HD (1920 x 1080 px) and the number of frames per second, which can be 24, 25, 30 or 60. When we talk about Formats we refer to container formats in addition to audio and video file codecs. We could say that the format is the storage "system" plus the compression codecs used. Examples

of formats: MP4, MOV, WMV, AVI, MKW.

Tool pack. There are certain classic tools that allow us to carry out the editing task: cut, copy and paste, select clips, group video clips. *Sound.* The sound is very important, as well as the number of tracks available in the program, volume variation, nodes and sound effects. Being able to synchronize the video shot with a sound shot when done on different devices. *Titles.* Possibilities to add titles and credits to the video. Ease or difficulty, and the options available. *Export.* Exporting is related to the resolution, container formats and codecs of the videos. *Color and gloss correction.* It is an important function for the final aesthetics of the work. Color in film is additive and is formed by light. In this case it is formed by pixels. Technological advances make it possible to retouch the image. Manovich (2006) points out that these corrections are provided by a set of algorithms.

Method

Research design

The methodology used was *mixed*, one part quantified on a numerical scale and the other part qualitative. The research design was *descriptive*, properties and characteristics of the software were specified, and the data obtained were quantified in graphs for comparison. Information was taken at a certain point in time. It was non-experimental, the phenomena were observed in their natural environment and then analyzed. The research cut was *cross-sectional*. Although a previous experience was taken into account, which was an orienting antecedent that gave a longitudinal touch to some assessments.

Population and Sample

The population studied was free or free video editing software on the Windows operating system. It was a census since there was no sample. The idea was to see all the programs that met these requirements in order to select the best ones. Based on Internet research, we searched for possible software. All free and open source editing programs were considered.

Measuring Instruments and Techniques

The test, through editing exercises, with a questionnaire and scoring, was the main tool to obtain data from each program. A comparative benchmarking study was then carried out, taking as a reference the programs considered to be the best so far. Each data collection instrument was designed to measure the editing variables and then compare the software.

Procedures

The first part of the research, to access these software, was through the little existing bibliography and some Internet sites. At the time I visited several, one of them was ABC do Video, by Lucas Conde, from which I took into consideration a small pdf publication "30 ferramentas gratuitas para la producao do vídeo", which served me as a reference. There he synthesizes several programs, which I considered.

With the third specific objective, to select the most appropriate software for editing, in mind. I considered different software and following selection criteria I arrived at the software to be analyzed. On the one hand, there were the free software that private companies made available and were a priori the software with the most potential, which

we took as a reference. From Hitfilm Express I used version 18. In the case of Da Vinci I used version 15, a later version did not work on my computer, seventh generation i5, with solid disk and Nvidia GeForce GTX card.

The free versions of Hitfilm and Da Vinci Resolve have some limitations compared to their paid versions, but they are enough to consider them excellent editors, that's why I considered them as the models to follow. On the other hand there was the free software, which we studied to see if it could come close to or match this freeware. The programs finally selected, after overcoming the filters described in the introduction and which were on an equal footing in terms of their operating structure as video editors, were Kdenlive and Shotcut, in addition to those already mentioned.

The analysis was carried out with measurement and testing tools, questionnaires and tests on the selected programs, and a comparative study. Establishing scores and determining the possibilities of each one. Several tests were performed to measure program variables: resolution, user interface, video and sound toolkit, settings, nodes, learning difficulty, titles and credits, color, formats and codecs. Below are the comparative results of measuring these variables.

Results

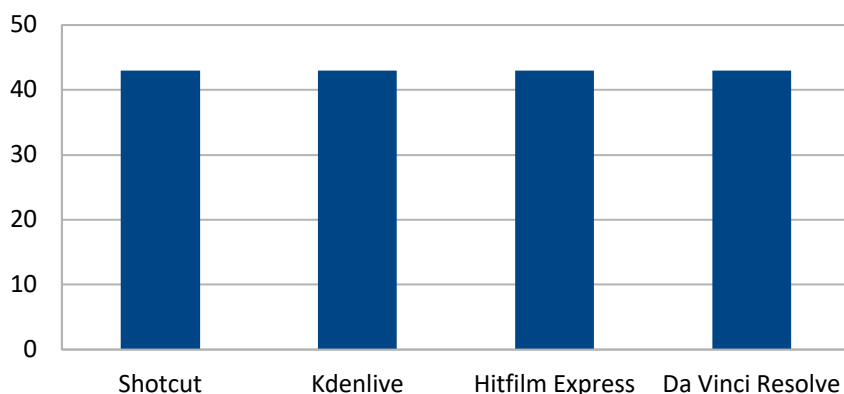
We found only two license types gpl-gnu with copyleft and freeware. All the programs are on a web site and have manual or video tutorials, which makes it easy to learn.

Result Resolution and Video Tools

All programs import and export in Full HD and 4K. All four programs proved to be very stable and worked very well without any problems. The video editing tools of the 4 programs are very good. In Shotcut, to group clips, you have to do it by pressing the Control key and selecting the different clips. In Kdenlive to group clips you must press the Shift key plus a mouse click.

Figure 1

Result Test 1



Sound Result

Sound is a very important resource for audiovisual language; it is a variable that must be considered for editing.

Figure 2
Sound export result

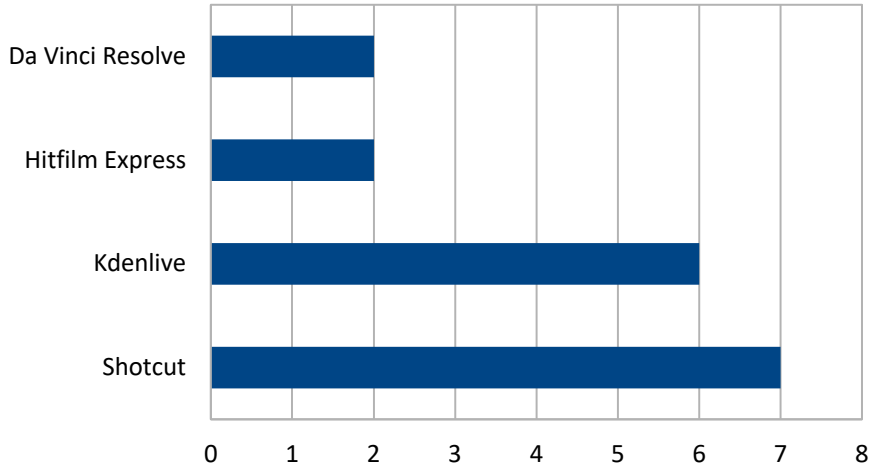
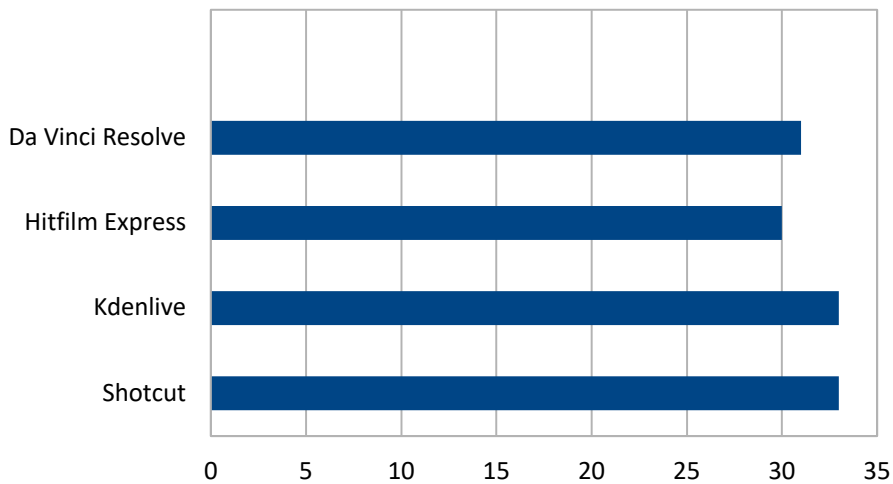


Figure 3
Sound test result



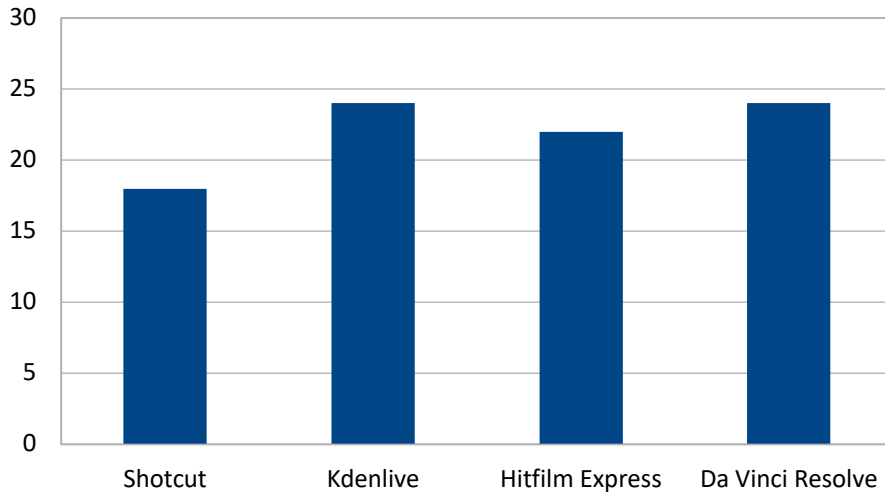
The program that has the most sound codecs is Shotcut followed by Kdenlive, both far behind the other programs. When we compare the sound tools in total it is very even, but the highest score was obtained by the free software Shotcut and Kdenlive.

When we take the result of the codecs from the graph it is even, but the tendency is towards freeware. Formats and codecs make the difference in this test. Free software is ahead in codecs and on par in all other tools, just below Da Vinci and Hitfilm.

Result Titles and credits.

In Shotcut, titles are made using filters and minimal learning is required. Hitfilm is not intuitive either, it requires minimal learning and watching a tutorial.

Figure 4
Result of titles and credits

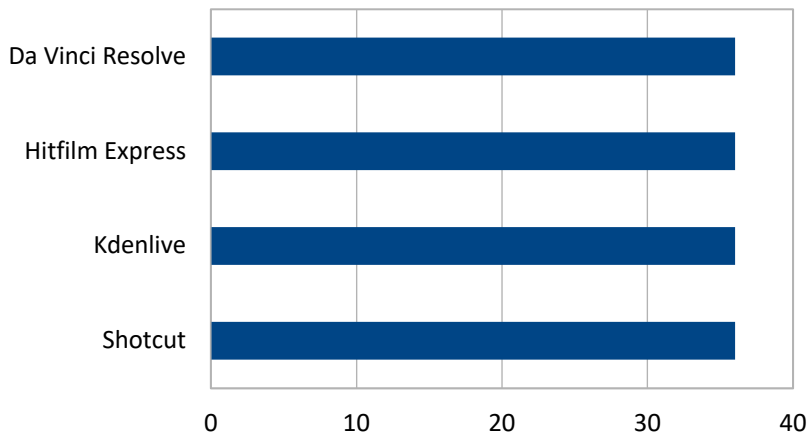


Kdenlive and Da Vinci are the two programs that excel in this test, both of which are intuitive and excellent.

Result Color correction and effects.

The programs have image adjustments, color and image effects, they are excellent in all questionnaires. Therefore, they obtain the maximum score in all items.

Figure 5
Adjustment and Color Result

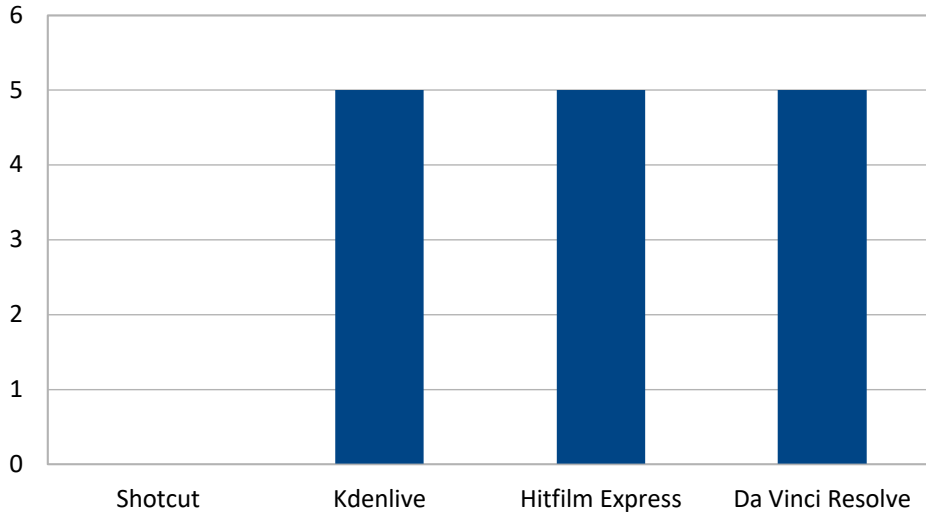


Although Da Vinci is the benchmark program for color post-production. With all programs you can make excellent color, tonality, brightness and some effect adjustments. With nuances of difference, characteristic of each program, they all obtained the maximum score in the questionnaire. With all programs you can do a decent job of color post-production.

Result Audio Synchronization

With Kdenlive, Hitfilm and Da Vinci you can synchronize sound automatically. That is, a video shot with a sound shot, recorded with different devices. In the case of Shotcut this is not possible and must be done manually. In Da Vinci it is very easy to do this by linking the clips and clicking the right mouse button to go to the *waveform* function. In Hitfilm this is done by selecting the clips in question and with the right mouse button selecting *Merge* creates a new clip with synchronized audio. In Kdenlive it is also simple by right-clicking on an audio reference and then synchronizing the clip to that reference.

Figure 6
Audio synchronization result



Result Video Export Formats and Codecs

Figure 7
Result of Video Export Formats

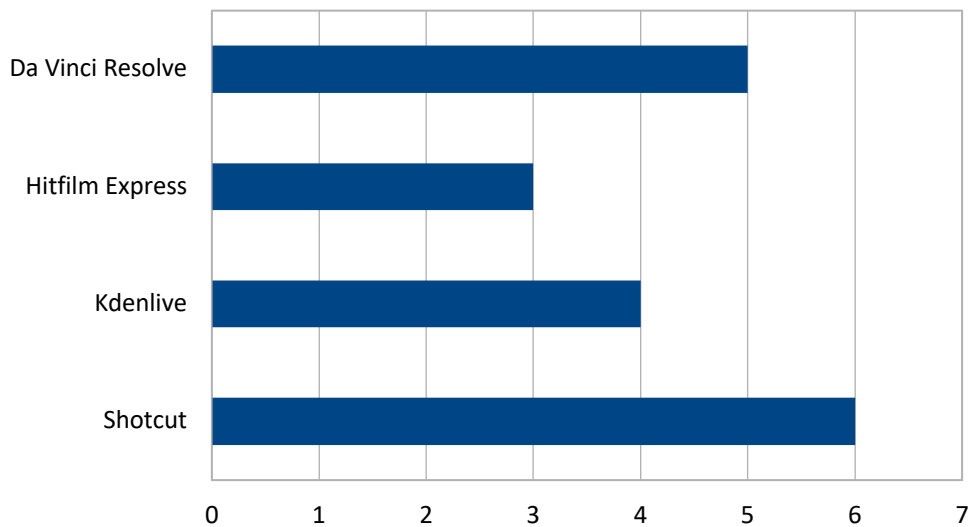
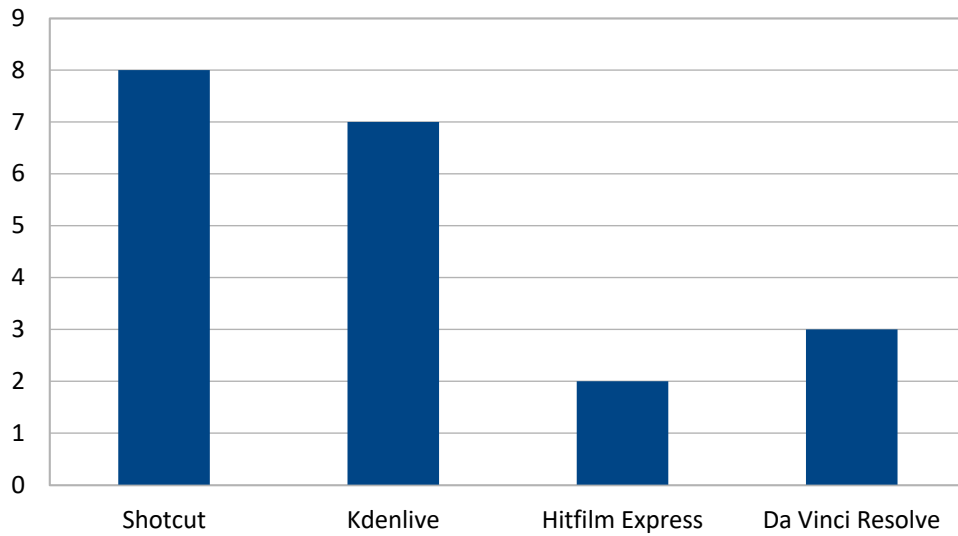


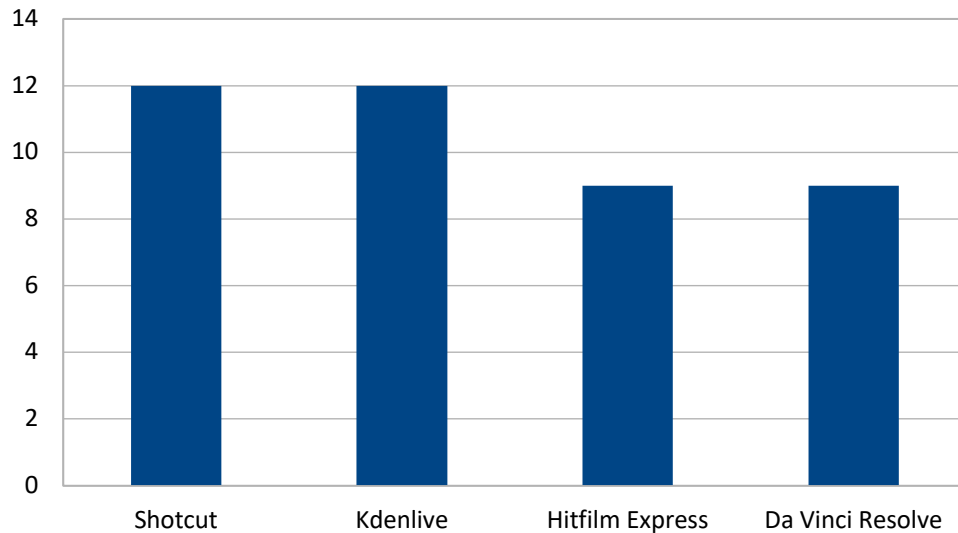
Figure 8
Result Video export codecs



Formats and Codecs Test Result

A test was performed with a package of 6 files with various video and sound formats and codecs. We tested in each program if they could be imported correctly.

Figure 9
Format and codec test results



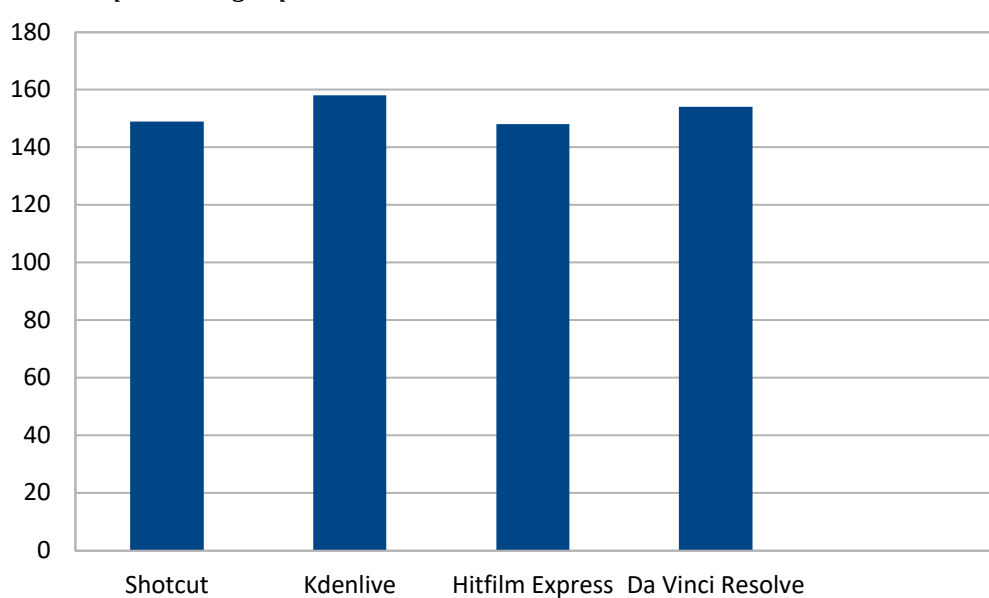
From these tests we conclude that free software is more generous in terms of format and codec compatibility, and processes and exports more of them.

Table 1
Total comparative score

Test	Shotcut	Kdenlive	Hitfilm	Da Vinci
Video Resolution and Tools	43	43	43	43
Sound	26	27	28	29
Titles	18	24	22	24
Adjustments, color and effects	36	36	36	36
Synchronize AV	0	5	5	5
Export formats and codecs	14	11	5	8
Format and Codec Testing	12	12	9	9
Total score	149	158	148	154

Figure 10
Total score, comparative graph 1

Note:
is



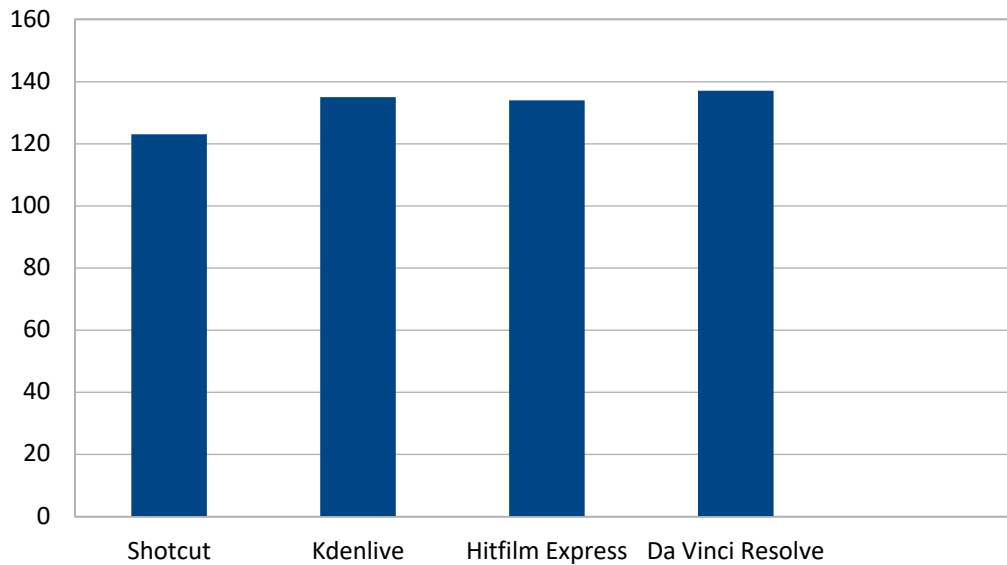
Sound

scored without codecs so as not to skew the result. Therefore, the format and codec test was added, which is more accurate.

Table 2
Comparison of total score without considering formats and codecs

	Shotcut	Kdenlive	Hitfilm	Da Vinci
Total score without test, format and codec test.	123	135	134	137

Figure 11
Scoring without Formats and Codecs



Without considering formats and codecs, in which free software has an advantage, we can observe that the graphs also show that the programs are very similar in terms of the results obtained. Allowing for a margin of error, the software would still continue with an even score.

Discussion and conclusions

Discussion

Shotcut appears as the most complete program in formats and codecs. It can be further improved, and has the advantage that it does not require as many system resources. Kdenlive is an evenly balanced program in all aspects, which has improved a lot in its Windows version since the last time I worked with it. It does not require as many system resources. Hitfilm features special effects which require a learning curve, and is even in the rest of the video editing functions, highly recommended. It does not require as many system resources. Da Vinci Resolve excels in color, but it is also an excellent full-featured editor. As a disadvantage we see that its latest versions require powerful computers.

According to the results of the comparative study score, we see that there is a great parity among the four programs finally selected. All four of the software seen here are a very good choice for professional editors. The content that is made with these software is independent of them, the vision of prosumers or emirecs that we set out in the Theoretical Framework serves to contextualize. The same happens in the case of Orihuela's paradigms that contextualize the moment, added to the fact that all these programs are downloaded thanks to the Internet.

The programs analyzed are cultural software that also have a symbolic value. These editing programs are cultural icons, each with its own particular characteristics. Due to the lack of new paradigms to study the new phenomena of Communication, from my point of view, and following Manovich's line of thought, the free software current can be considered as a new paradigm within Communication.

Is it necessary to have access to the source code? For someone who is not a programmer it would not be as important to access the source code, but it does provide more transparency to the program. Manovich mentions that it is not necessary to study the program from a computer science point of view, but rather as a cultural asset. You do not need to know the source code to operate the software and edit it. To adapt or improve the program it is necessary to access the source code. Free software gives more access to the media, mainly in third world countries where there is more economic inequality and it is often difficult to access the costs of proprietary software.

Free software and freeware can be considered as an alternative to access new media and content production in a more democratic way, reducing the digital divide. Being in the public domain, free software has the advantage over freeware that it does not depend on the good will of the companies, in case they change their mind and the software ceases to be free. Free software goes a step further in terms of freedom and humanity, and is part of the common good.

It is very good to have free programs that are up to the level of the paid ones, for editing. It is also very noble that two companies have made two excellent editors available in free versions. Fernández Gómez and Moreno mention similar concepts, that free software is not perennial since it does not depend on the company that develops the software, in case it stops providing support or abandons it. But as long as they can still be used, it's a very good thing. These are excellent options available thanks to the kindness of the companies. On the web page of the programs it is mentioned that it is with the purpose of providing access to creative people and that the use of software is not a limitation for a better and inclusive world, there is also an ideal behind these software.

Fernández Gómez mentions in his 2016 paper that the situation of free software is changing as it has already evolved a lot, but nevertheless lacks the tools to do professional color grading. Six years later in 2022, with Shotcut or Kdenlive you can currently do a more than decent color grading. Free software is already on a par with freeware from private companies. The result showed a surprising parity, even putting free software above free software in some functions. In 2018, this was not the case, freeware comparatively was ahead of free software.

Conclusions

1-Free software can be considered as a theory on the Media. The Internet and computers are a new means of communication, and the free software philosophy can be taken as a new communication paradigm.

2-The free video editing software we looked at is on par with the freeware analyzed. Da Vinci Resolve and Hitfilm Express were the ones that a priori appeared a step above as editors and referents, but according to the score obtained, this is not so much the case anymore.

3-A complementary toolkit can be formed with the four software analyzed. Depending on the technical possibilities and creative needs, each user may opt for one or the other alternative or have a combo with all four programs. Both free software and freeware are an excellent alternative to piracy.

Da Vinci Resolve appeared a priori as the best in class in terms of editing, color and effects capabilities. It remains a benchmark, but requires the use of powerful equipment and state-of-the-art graphics cards. However, Hitfilm, Kdenlive and Shotcut can be used with very good results on less powerful equipment. Shotcut and Kdenlive are very strong programs in terms of formats and codecs.

4-Da Vinci Resolve, Kdenlive and Shotcut work on all three operating systems: Windows, Linux and Macintosh. Hitfilm works in two: Windows and Macintosh.

5-Free software is different from free software. The freeware analyzed are excellent tools that can be complemented with those of free software. However, the philosophy of free software goes a step further, since it seeks emancipation, and is a common good that benefits humanity through the possibility of its use without limitations.

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