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Multimedia Authoring Tools: The Quest for an Educational Package

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ABSTRACT

Since the explosion in multimedia computing, educators have been trying to work their way towards integrated human-computer interaction. Consequently, a large number of multimedia tools have been created, always following the trend of simpler and easier multimedia development. After outlining the transition from hardcore programming to modern multimedia authoring systems, this paper leads the way through a large variety of products, trying to determine the criteria upon which one should base a software investment. To facilitate this attempt, a series of variables is introduced and, based on these variables, a typical evaluation takes place. Following that pattern, each tool is examined separately so that a reasonable amount of data is gathered and treated as the basis for a 5-scale point system. Informal as this may be, it not only helps in ranking the tools examined, but also in extracting the necessary statistics. A black spot on this analysis is the absence of education-related data, since no software package was found to be able to play a clear educational role. As a result to all the above, a top-7 list is presented, always based on the previously stated subjective criteria. The purpose of this work is to shed light on the case of multimedia computing, aiming to find a tool that could serve a purely educational purpose in the field of live presentations. The absence of such a tool is the conclusion of the whole study.

Keywords

Multimedia authoring tools, Educational multimedia, Multimedia software review

Introduction

Since the 1990s, the promise of multimedia computing has been to change the way people and computers interact with each other. However, while new technologies have been introduced since that decade, the whole concept is still not nearly as clear as pure programming or word processing. Of course, there is no need to point out that composing live multimedia presentations (interactive or not) is a procedure far more complex than writing plain text (Bulterman & Hardman, 2005). Because of this, the universality that programming languages can offer in multimedia authoring is sacrificed in order to reduce complexity. Thus, multimedia development typically takes place in an interactive development environment (IDE) that efficiently hides (from the developer) low-level programming details that handle multimedia objects (Henry & Bodnar, 2000). These authoring systems, which are actually nothing more than specially designed simplified programming languages, offer simple, interactive techniques that allow the composition of a multimedia application without requiring the user to acquire specialized knowledge and expertise (Preclik, 2000) and, of course, without the necessary cooperation of various professionals (Bailey & Konstan, 2000).

Several versions of this concept are projected on a large number of multimedia authoring tools that usually do no more than limit the available features (especially commercial systems) in order to artificially reduce complexity (Bulterman & Hardman, 2005). Still, the fact remains that an all-purpose authoring tool does not exist in reality; all commercially available tools have been designed and implemented aiming toward a different audience. (Agnew & Palmer, 1992).

The problem gets worse when one looks for an appropriate, educational, multimedia authoring software (sometimes called courseware): Claiming that computer-assisted learning (CAL) is a serious option for many educators (due to the pressure for alternative forms of educational delivery) would only be an understatement (Dalgarno, 1998). However, it is crucial to really *assist* learning rather than merely use static presentations that do not incorporate users' responses. Such presentations practically force students to watch the same presentation, even if the computer has accepted input indicating that the topic has been understood (Shih et al., 1996).

Therefore, the question stands: How can an educator gain access to this kind of application? For one, purchase is too costly an option, available only to some schools and educational institutions. The other way is to develop an

application for specific needs, which is also very expensive. Developing an application from scratch requires money and time, which are usually unavailable. On the other hand, buying a commercial package means complying with the features offered: even first-rate software, whose price cannot be met by everyone, encounters problems with localized habits of various countries, for example, language, educational needs, etc. (Preclik, 2000).

It is obvious that there is a wide variety of characteristics that are met (or not met) by each multimedia authoring tool. These characteristics are difficult to fully examine when a user/buyer is looking for the appropriate tool for a certain job. And, of course, the whole dilemma gets only harder when we are not referring to a computer expert but to an individual who only wishes to do a job quickly, easily, and in a cost-effective way.

The purpose of this article is to shed light on the criteria one should use in the quest for a multimedia authoring tool that best suits one's needs, especially when following an education-oriented approach. In this quest for educational multimedia authoring software, many multimedia authoring packages are evaluated through predefined points: a set of variables (cost, platform, image formats supported, etc.) that enable a typical evaluation. Finally, this paper discusses the lack of education-related data, which constitutes the ultimate goal of this study: to specify, if possible, an authoring package that can be used by an educator (with no particular expertise or financial background) in order to facilitate a course in any field or subject.

In simpler terms, this effort is about software selection: "How many kinds of image/sound extensions can a tool support," "Does it support some kind of animation?" "Do I need the program to run the files produced, or is it possible to make executable files?" "Do I need to pay for a license to use the program, or is it free?" All this has to be clear. This study sees to that. Summing up, the steps followed are:

- Background examination of the field
- Definition of all the criteria used to evaluate the authoring tools
- Data presentation for all 44 programs (the data were properly installed and examined separately)
- Grading scaled up to 5 (at first)
- Statistics examination
- "Top 7 tools" review/educational overview
- Summing up/Conclusions

```
T:Which of the following is contained in triple sugar?
:
:       1. dextrose, maltose, and lactose
:       2. lactose, sucrose, and glucose
:       3. rhamnose, lactose, and glucose
:       4. glucose, arabinose, and lactose
:
A:
M: 1 , 2 , 3 , 4
J(&Y = 2):*RANS
T:Wrong, 2 is correct.
E:
*RANS
T:Right
E:
```

Figure 1. Code example in PILOT (Preclik, 2000)

Background

In the beginning, programming languages (such as Basic, Pascal, and C/C++) were the only tools for developing an educational multimedia application. However, while they were powerful enough to build almost anything, that same universality was their greatest disadvantage. After a while, this gap for simplicity was filled by authoring languages. In reality, authoring languages were about more specialized languages containing fewer commands. Unfortunately,

the outcome was not much desired: The specialization — no matter how desired at first — was a major drawback. Coding anything out of the ordinary was extremely difficult and complicated, while some tasks were impossible. PILOT (an example of its code can be seen in Figure 1) was one of the first authoring languages (Preclik, 2000).

Apart from that, during the previous decade, authoring systems had come on the scene. Authoring systems are more complex development environments that allow users with no time or interest in programming to compose educational multimedia presentations interactively by clicking on objects, choosing menus, or following wizards. In comparison with traditional programming, only 1/8 of the time is needed to produce an educational presentation using an authoring system (Preclik, 2000). Of course, one can easily assume that the tools in question offer much fewer possibilities than traditional programming or authoring languages, due to the very same specialization that also constitutes authoring systems' greater advantage. A simple comparison of these three categories is shown in Figure 2 (Preclik, 2000).

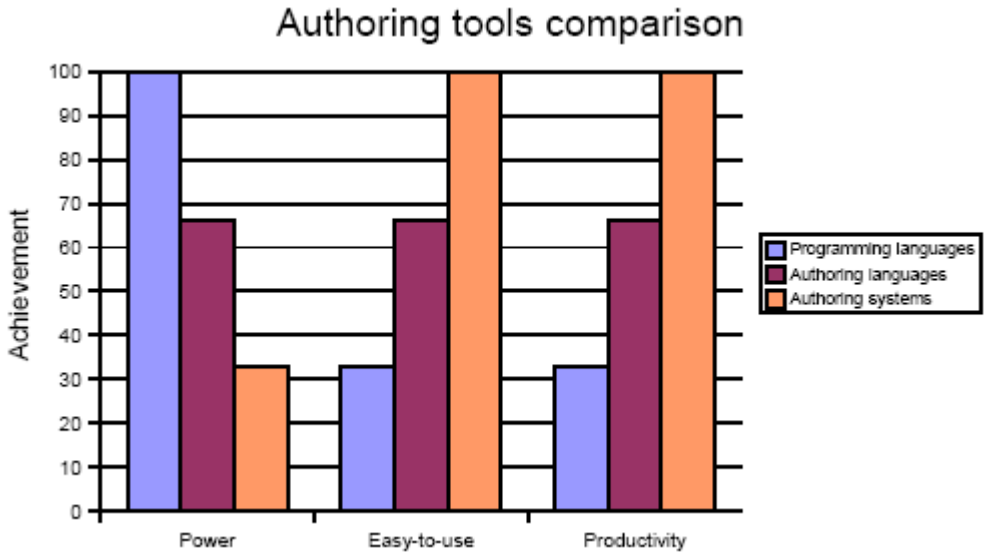

Figure 2. Authoring tools comparison (Preclik, 2000)

Having analyzed authoring systems further, we can state with certainty that, at first, it was all about applying interfaces onto authoring languages and nothing more. This merely meant materializing the idea of combining command modules for experienced users with GUIs (Graphic User Interfaces). However, future generations of similar packages were based on different concepts (Preclik, 2000).

Criteria

So far, we have argued that selecting an authoring system is a complex procedure. Therefore, locating a number of standards that a multimedia authoring package could meet would mean simplifying the whole concept.

A substantial effort by Preclik (2002) produced the following variables:

(1) *Variety of designed applications*: Usually, less sophisticated authoring tools offer only the ability to design applications identical to one another. Of course, this is a result of the efforts to minimize package complexity which leads to a subsequent drop of the abilities' standard.
(2) *User interface*: Normally, a good interface presents itself in two modes (at least): The "beginner mode," with only the basic capabilities, and the "expert mode," which offers all available features.
(3) *Test questions*: Rather than offering just plain multiple-choice questions, complex systems distinguish themselves by offering much more: hotspot questions, drag-and-drop questions, short-answer questions, true/false questions, etc.

(4) *Multimedia*: The truth is that even the most simplified software systems offer multimedia imports. However, what can be measured are the supported file types (BMP, GIF, JPEG, WAV, AVI, MPEG, etc). Needless to say, the sole number of file types may be misleading: an authoring system that supports only two image types (BMP and GIF) is perhaps far superior to one that supports 10 possible types but not these two.
(5) *Data communication with other applications*: This feature is useful when trying to extract or import data from and into the system. For example, sophisticated tools can export test data in the form of spreadsheet files, interact with databases (via ODBC drivers), and import a variety of file types (as DOC, RTF, HTML, XML, etc).
(6) *Branching*: Unlike simply linear systems, complex authoring tools connect independent screens or forms via links that can be followed at the user's will. Moreover, some systems even decide which screen will be presented next, depending on the user's answers or preferences.
(7) *Scripting*: Even when hypothetically using the "best tool for the job," sometimes there are ideas that cannot be materialized in a standardized way. This means that there has to be a more or less simplified way to program these tasks. Of course, that can only be realized through a kind of programming language, which can differ among cases. Some programs may offer traditional text-based scripting while others might host some kind of simplified visual programming that can be approached more easily by less-experienced users.

Having examined the above testimonies, one can easily determine that these variables can describe an authoring system in its entirety. Obviously, in some cases, there is a need for neutral measurements rather than questions such as "How good is...?" which are subjective by default. Therefore, always in coordination with the market status, each multimedia authoring tool examined by the research presented in this article is characterized by the following variables:

(1) Program and company name
(2) Price: Even if it's "the greatest tool ever built," if it's too expensive, people won't buy it. Price is perhaps the first factor buyers consider when looking for a multimedia authoring package.
(3) Platform: Assuming that the best solution has been spotted, the benefit is minimal if a certain operating system or architecture is pre-conditioned. For example, a tool that runs on Linux, Windows, and Mac-OS is substantially more "easy-going" than a system that runs only on Windows 98.
(4) Text editor: Usually, most programs offer basic text-editing capabilities. Of course, by no means does that mean that one could write a whole essay using that particular feature. Rather, in many cases, it means a simple textbox that can hold a certain "amount" of text and some basic formatting capabilities are offered.
(5) Text import formats: As stated above, most of the times it is far better to merely import a text than to write it again from scratch. Therefore, a decent tool has to import at least the basic text formats such as DOC, RTF, TXT, etc.
(6) Video formats: Of course, the same principle applies to video file types (after all, this is about "multimedia" applications). Thus, in accordance to the above, a system that allows AVI, MPEG, MOV, QT, and ASF imports, for example, outclasses one that can work only with MOV and AVI files. However, it would be an oversight if copyright issues weren't mentioned at this point: some video — as well as sound and image — formats are offered in exchange for money. This means that a program using the MP3 encoding has to pay copyright fees to the corresponding company, a cost that naturally has to be passed over to the final buyer.
(7) Sound formats: Considering that sound is a "must have" in multimedia presentations, the more supported sound formats, the better. Usual file types are WAV, MIDI, MP3, CDA, and Real Audio. The truth is that anything beyond that is a luxury, while anything far less is a handicap.
(8) Image formats: Even more important than the above, images can be imported in an application as pictures, diagrams, or even buttons. However trivial this may seem, there are tools that support as many as 32 image file types, as opposed to other tools that support only BMP and JPG. In actual practice, having to convert each image to BMP or JPG is a big deal.
(9) Drawing: This variable refers to whether the program lets the user draw his own shapes or pictures. Some systems do that. In most cases, however, the drawing tool includes only basic shapes and some systems do not support drawing at all. That means that the user must use another program to draw a graphic element (e.g., a simple arrow) and then import it as a picture, which may require converting the graphic element to a file type that is supported by the system.
(10) Export: While every tool can produce a fair multimedia presentation, an above-average package can export editable files in the form of executable files such as AVI, MOV, or animated GIF.
(11) Script: As stated earlier, scripting is a powerful feature for any authoring tool that claims to be an integrated "tool." By using a script editor, the user (usually the more experienced one) can alter little details or even

program the whole application from scratch. Without a script editor, the user can produce only the typical features offered by default, which is why one can find numerous presentations that are identical in design, color, buttons, shapes, navigational flow, etc. Unfortunately, it is not feasible to evaluate script editors for it would take too much time. In this study, what is questioned is the mere existence of a script editor and nothing more.

(12) 3D: This variable represents whether the program works with 3D images or not.

(13) Animation: Despite the fact that one of the main reasons a presenter chooses a computer-based authoring tool over regular transparencies is for its animation capabilities, several packages offer very little animation or no animation at all. Even if a package does offer animation capabilities, these capabilities may differ from other programs. Because of this, many questions have to be asked: "What kind of animation is offered?", "Is the system capable of handling animation without the help of external file types (SWF, for example)?", "Is there a need for third-party plug-ins?", etc.

(14) Effects: Extending the previous variable, most programs offer some effects (such as slide transitions, for example).

(15) Needs player: As controversial as this concept may be, the need for a separate player in order for a file to be executed can be a virtue, especially if the system cannot export editable files in the form of executable file types. For example, imagine a package that needs a large amount of disk space. This means that the same program has to be installed on one's laptop, even if that particular machine is used only for runtime mode rather than editing. On the other hand, the existence of a player means that the plug-in (which requires minimal disk space) can be installed on a specific portable computer. This may offer only playtime properties but this is the main purpose assuming that that particular PC is used only for presentations.

(16) Licence: Since cost is a great factor when looking for a sufficient tool, licensing is one thing that should not go unnoticed. Therefore, one has to wonder about many things: Is it 30-day-trial software? Shareware? Freeware? If not, is there an evaluation edition? Assuming that I buy it, do I need a separate licence for every computer or not? If I represent an educational institution, am I eligible for an academic licence?

(17) WYSIWIG Design: WYSIWIG (What You See Is What You Get) means that the user composes each application through the eyes of the final user. This may seem strange to most people as old design tools required the user to design in a strange GUI (Graphical User Interface), which had nothing to do with the outcome, or even work with plain code.

(18) Interactivity: Similar to branching (Preclik, 2002), interactivity has to do with the user's power to define the application's final outcome: Is the tool in the position to produce interactive applications or merely series of linear slide transitions?

(19) Address/Notes: Finally, the shading of all the selected authoring tools ends with an Internet address (for more information, downloads, etc.) and some notes that may be useful.

Data

In our study, 44 authoring packages were examined. At first, the survey was held only in a data-collecting manner. This means that the whole effort revolved around a catalogue core that was informed about the latest characteristics of all the packages analyzed. In simpler terms, the first stage was about collecting information about all 44 tools and nothing more.

The data is presented in table 1, with comments listed below the table.

Table 1: Package identity

	Program	Company	Price	OS
1	Authorware	Macromedia	$2,999	Windows/Mac
2	CBTMaster (Lessons)	SPI	$49	Windows
3	DazzlerMax Deluxe	MaxIT Co.	$1,995	Windows
4	Director	Macromedia	$1,199	Windows/Mac
5	EasyProf	EasyProf	€1,105	Windows

	Program	Company	Price	OS
6	eZediaMX	eZedia	$169	Windows/Mac
7	Flash	Macromedia	$499	Windows/Mac
8	Flying Popcorn	Parasys	$149	Windows
9	Formula Graphics Multimedia	FGX	$49.95	Windows
10	HyperMethod	HyperMethod	$190 (standard)–$390 (pro)	Windows
11	HyperStudio	Knowledge Adventure	$69.95 (student edition)–$199.95 (teacher edition)	Windows/Mac
12	InfoChannel Designer	Scala	$359	Windows
13	iShell 3	Tribeworks	$495	Windows/Mac
14	Liquid Media	SkunkLabs	$140–$200 (academic)	Windows
15	Magenta II	Magenta	$149	Windows
16	MaxMedia	ML Software	$50 (standard, CD-ROM)–120$ (pro, CD-ROM)	Windows
17	Media Make&Go	Sanarif	€399	Windows
18	Media Mixer	CD-Rom Studio	$75	Windows
19	MediaPro	MediaPro	$99	Windows
20	Mediator 7 Pro	Matchware	$399	Windows
21	MetaCard	MetaCard Co.	$995	Windows/Mac/ UNIX
22	Motion Studio 3	Wisdom Software	$39.95	Windows
23	MovieWorks Deluxe	Interactive Solutions	$99.95	Windows/Mac
24	MP Express	Bytes of Learning	$49.95	Windows/Mac
25	Multimedia Builder	Media Chance	$60 (with MP3 license)–$45 (without)	Windows
26	Multimedia Fusion	ClickTeam	$99	Windows
27	Multimedia Scrapbook	Alchemedia, Inc.	$89	Windows
28	MultimediaSuite		$649	Windows
29	Navarasa Multimedia 4	Navarasa Multimedia	$29.99	Windows
30	NeoBook	NeoSoft Co.	$199.95	Windows
31	ODS Players	Optical Data Systems	$229	Windows
32	Opus Pro	Digital Workshop	$249.95	Windows
33	Ovation Studio Pro	R.I. Soft Systems	$399	Windows
34	Platypus Multimedia Author	Platypus Software	$228 (standard, no VBScript)–$272 (pro, with VBScript)	Windows
35	PowerPoint	Microsoft	$229	Windows
36	Presentation Publisher	CMB Software	$89.95	Widows
37	Presentation Wizard	Alchemy Mindworks	$30	Windows

	Program	Company	Price	OS
38	Revolution	Runtime Revolution	$497.5 (educational)	Windows/Mac/ Linux
39	Shelldrake Developer	Shelldrake Technologies	Not available	Windows
40	Slim Show	PC Whole Ware	$49.95 (personal edition)	Windows
41	SuperLink	Alchemedia,Inc.	$129	Windows
42	Tactic!	BGW	Not available	Windows
43	ToolBook Instructor	Click 2 Learn	$2,599	Windows
44	TwinPlayer 3	CD-ROM Studio	$110	Windows

- Table 1
  - *Program*
  - *Company*
  - *Price*: While most packages are uniquely-priced, some companies offer two-level pricing. For example, Multimedia Builder without the mp3 licence costs $15 less, while SkunkLabs offers a $60 discount at Liquid Media for academic use.
  - *Operating System*: From a merely statistical point of view, all packages are offered for Windows, 10 for MacOS, while only MetaCard (by MetaCard Co.) and Revolution (by Runtime Revolution) can be installed onto Linux-based systems.

Table 2. Text and video

	Program	Text editor	Text import formats	Video formats
1	Authorware	Yes/RTF	TXT, RTF	Bitmap Sequence, Director, AVI, MPEG, WMP, MOV
2	CBTMaster (Lessons)	Yes	No	DIR, MPEG, MOV, AVI
3	DazzlerMax Deluxe	Yes, RTF	DOC, RTF, TXT	AVI, MPEG, MOV
4	Director	Yes	RTF, HTML, ASCII	Quick Time, AVI, RealMedia
5	EasyProf	Yes	RTF, TXT, HTML, DOC	MOV, MPEG, AVI, ASF, etc.
6	eZediaMX	Yes	No	MOV, AVI, MPG, etc.
7	Flash	Yes	No	AVI, MPEG, MPG, MOV, WMA, ASF
8	Flying Popcorn	Yes	TXT	AVI, MPG, MOV
9	Formula Graphics Multimedia	Yes	RTF, HTML	AVI, MOV, MPEG
10	HyperMethod	Yes	TXT, RTF, HTM, PDF	MPEG, MPG, AVI, MOV
11	HyperStudio	Yes	TXT, RTF	AVI, MOV
12	Infochannel Designer	Yes	TXT	MPEG, AVI, Quick Time
13	iShell 3	Yes	RTF/ HTML 2	AVI, MOV
14	Liquid Media	Yes	No	AVI, MPG, MPEG, MOV, MPE, SFK, IVF

	Program	Text editor	Text import formats	Video formats
15	Magenta II	HyperText	HTM, HTML, TXT, RTF	AVI, MOV, MPEG, MPG
16	MaxMedia	RTF, Plain text	RTF, TXT	AVI, MPEG, WMA, ASF
17	Media Make&Go	Yes (short text)	RTF, TXT, HTM	MOV, AVI
18	Media Mixer	Yes	HTM, HTML, RTF, TXT	AVI, MOV, MPG
19	MediaPro	TXT/RTF editor	TXT, RTF	AVI
20	Mediator 7 Pro	Yes	DOC, XLS, PDF, WRI, RTF, TXT	AVI, MPG, ASF, WMV
21	MetaCard	Yes	TXT	AVI, MPEG, Quick Time
22	Motion Studio 3	Yes	No	No
23	MovieWorks Deluxe	Yes	TXT	MOV, MW Video
24	MP Express	Yes	No	AVI, MOV
25	Multimedia Builder	Yes	TXT, HTML	AVI, MPEG, MOV, DAT, ASF
26	Multimedia Fusion	TXT, RTF	TXT, RTF, PCF	QuickTime, AVI, MPEG
27	Multimedia Scrapbook	Yes	No	AVI
28	MultimediaSuite	Yes	HTML	AVI, MPG, MPEG
29	Navarasa Multimedia 4	Yes	HTM	AVI
30	NeoBook	Yes	DOC, HTML, TXT, RTF, ASCII	AVI, MPEG
31	ODS Players	Yes	RTF	AVI, MPG
32	Opus Pro	Yes	TXT, RTF	MNG, AVI, MPEG, MPG, MOV, ASF, WMA, WMV
33	Ovation Studio Pro	Yes	RTF, TXT	AVI, MPE, MPG, MOV, QT
34	Platypus Multimedia Author	Yes	HTML, DOC, PDF, TXT, RTF, etc.	AVI, MOV, WMV
35	PowerPoint	Yes	HTML, DOC, TXT, RTF, etc.	AVI, MOV
36	Presentation Publisher	Yes	No	AVI, MPG
37	Presentation Wizard	Yes	No	No
38	Revolution	Yes	TXT, DOC	AVI, MPEG, QuickTime
39	Shelldrake Developer	Yes	No	AVI
40	Slim Show	One line only	TXT	AVI, MPG

	Program	Text editor	Text import formats	Video formats
41	SuperLink	Yes	TXT	AVI, MOV, MPG
42	Tactic!	Yes	TXT, RTF, HTM, HTML, ASF, PPT, PPS, DOC, XLS	AVI, MPG, MPEG, MOV, ASF, WMV
43	ToolBook Instructor	Yes	RTF, TXT	AVI, MOV, MPEG, MPG, ASF
44	TwinPlayer 3	Yes	HTM, HTML, RTF, TXT	AVI, MOV, MPG

- Table 2
  - *Text editor*: All systems offer some form of text editing, except for Slim Show (by PC WholeWare), which offers only one-line editing, and Media Make&Go, which can edit only short text.
  - *Text import formats*: Almost every package can support a text import of a usual kind (TXT, RTF) while in 10 cases, text importing is not permitted at all.
  - *Video formats*: Only Motion Studio 3 (by Wisdom Software) and Presentation Wizard (by Alchemy Mindworks) offer no video formats whatsoever. On the contrary, Opus Pro (by Digital Workshop) offers eight possible video extensions.

Table 3. Sound and image formats

	Program	Sound Formats	Image Formats
1	Authorware	MP3, WAV, AIFF, PCM, SWA, VOX	WMF, PICT, GIF, JPEG, xRes LRG, PNG, Photoshop 3.0, TARGA, TIFF, EMF, BMP
2	CBTMaster (Lessons)	AIFF, WAV, MP3, PCM, SWA, VOX	BMP, GIF, JPG, TIF, WMF, PNG, TGA
3	DazzlerMax Deluxe	WAV, MIDI, AU, MPEG	BMP, PCX, TIFF, TARGA, JPEG, EPS, PNG, WMF, PSD, PICT, SUN Raster
4	Director	MP3, WAV, AIF, RealAudio	BMP, GIF, JPEG, LRG (xRes), PSD, MacPaint, PNG, TIFF, PICT, Targa
5	EasyProf	WAV, MIDI, AU, MP3	PNG, GIF, JPG, JPEG
6	eZediaMX	WAV, MP3, AU, AIFF, MIDI, etc.	BMP, FPX, GIF, JPG, PNTG, PNT, MAC, PSD, PICT, PNG, QTIF, QIF, QTI, SGI, RGB, TGA, TIFF
7	Flash	MP3, WAV, AIFF	PNG, EPS, AI, DXF, BMP, DIB, EMF, GIF, JPG, WMF, PCT, PNTG, Photoshop 2.5/3, QTIF, SGI, TGA, TIFF
8	Flying PopCorn	WAV	BMP, JPG, GIF, HDC, CAL, EPS, IMG, JIFF, MSP, PCD, PIC, PCX, PSD, RAS, TGA, TIF, WMF, WPG
9	Formula Graphics Multimedia	WAV, AU, MIDI, Audio CD	BMP, PNG, JPG, GIF, TGA, VDO, WDO, XDO
10	HyperMethod	MIDI, WAV, MP3, AU, AIFF	BMP, GIF, JPG, WMF, EMF
11	HyperStudio	WAV	BMP, PCX, GIF, JPG, TIF, PCT, PIC, TGA, BIF, WMF, PNG, PSD
12	InfoChannel Designer	WAV, MIDI, MP3, CDA	BMP, GIF, IFF, JPEG, PCX, PNG, Targa, TIFF, WMF
13	iShell 3	MP3	BMP, JPG, GIF, PNG, PSD, FPX, TIF

	Program	Sound Formats	Image Formats
14	Liquid Media	WAV, MP3, WAX, WMA, WMV, WVX, CDA, MIDI, RMI, IVF, M1V, AIF, AIFC, AIFF, ASF, ASX	BMP, LBM, GIF, IFF, JPEG, JIF, JNG, KOA, PCD, MNG, PCX, PSD, PBM, PGM, PNG, PPM, Quick Time files, RAS, TIFF, TGA, WBMP, ICO, WMF, PCX
15	Magenta II	MP3, WAV, MIDI	BMP, ICO, JPG, JIF, JNG, KOA, IFF, LBM, MNG, PBM, PGM, PNG, PPM, RAS, WAP, WBMP, WBM, TIFF, TGA, TARGA, PSD, CUT
16	MaxMedia	MP123, WAV, MIDI, WMA, WAX	BMP, JPG, WMF, EMF, ICO
17	Media Make&Go	WAV, AIFF	TIFF, PSD, GIF, JPG
18	Media Mixer	WAV, MID, MP3, AIFF, AU, CDA	BMP, JPG, JPEG, GIF, ICO, EMF, WMF
19	MediaPro	WAV	BW, CEL, CUT, DIB, GIF, ICB, PCC, PCD, PDD, PCX, PIC, PBM, PGM, PPM, PSD, RGB, RGBA, RLA, RLE, RPF, SCR, SGI, TGA, TIF, VDA, VST, WIN, JPG, BMP, ICO, EMF, WMF
20	Mediator 7 Pro	MP3, WAV, MIDI, WMA	JPG, BMP, GIF, PNG, TIF, WMF, TGA, PCX
21	MetaCard	WAV, AIFF, AU	BMP, JPG, GIF, PICT, XWD
22	Motion Studio 3	WAV, MIDI, MP3, RMI	BMP, JPEG, JPG, PNG, GIF, ICO, CUR, ANI, TIFF, TGA, PCX, PGM, DIB, RLE, WMF, EMF
23	MovieWorks Deluxe	MIDI, WAV, AIF, CDA, MW Sound	BMP, GIF, JPG, PSD, PNG, Quick Time
24	MP Express	WAV	BMP, JPG, GIF
25	Multimedia Builder	WAV, MID, RMI, MOD, S3M, XM, IT, MP3, WMA	BMP, JPG, GIF, PCX, PNG, TIF
26	Multimedia Fusion	WAV, MIDI	BMP, DIB, JPG, JPEG, PCX, GIF, RLE, LBM, IFF…
27	Multimedia Scrapbook	WAV	BMP, PCV, PCJ, PCZ, JPG, GIF, DIB, PCX, PCM
28	MultimediaSuite	MP3, WAV	BMP, JPG, ICO, WMF
29	Navarasa Multimedia 4	WAV, MIDI, MP3	BMP, ICO, WMF, EMF, GIF, TIF, PNG, JPG
30	NeoBook	WAV, MIDI, MP3	BMP, JPG, GIF, PCX, PNG, TIFF, ICO, WMF
31	ODS Players	WAV, MID, MP3	JPG, BMP, GIF, TIF
32	Opus Pro	WAV, MP3, WMA, ASF, MIDI	BMP, CGM, JPG, PCX, PNG, TGA, TIF, GIF, PCD, WMF, EMF, CDR
33	Ovation Studio Pro	WAV/MIDI (audio mixing)	BMP, JPG
34	Platypus Multimedia Author	WAV, MP23, SND, AU, AIF, WMA, MIDI, CDA	BMP, PCX, GIF, DIB, RLE, TGA, TIF, JPG, PNG, WMF

	Program	Sound Formats	Image Formats
35	PowerPoint	MID, RMI, WAV, MP3, CDA	EMF, WMF, JPG, JPEG, JFIF, JPE, PNG, BMP, DIB, RLE, BMZ, GIF, GFA, WMZ, PCZ, PCD, PCX, MIX, CDR, CGM, PCT, PICT, EPS, FPX, TIFF, TIF, WPG
36	Presentation Publisher	WAV, MID, MP3, RMI	JPG, GIF, BMP, TIF, PNG, TGA, WMF, DIB, JIF, RLE
37	Presentation Wizard	WAV, MIDI	JPG, BMP, PCX, TGA, PNG
38	Revolution	WAV, AU, AIFF	BMP, JPG, JPEG, GIF, PNG (Windows)
39	Shelldrake Developer	WAV	BMP
40	Slim Show	WAV, MIDI, RMI	BMP, JPG
41	SuperLink	WAV	BMP, PC, GIF, JPG, FIF, DIB
42	Tactic!	WAV, MID, ASF, AU, MIDI, MP3, WMA	BMP, PCT, PCX, EPS, JPG, PCD, PNG, PSD, RAS, TIF, TGA, WMF, WPG, GIF
43	ToolBook Instructor	CDA, MP3, WAV	BMP, DIB, WMF, DXF, GIF, CDR, CH3, SY3, JPG, PCD, PIC, PCT, DRW, PCX, EPS, TIF, TGA
44	TwinPlayer 3	WAV, MID, MP3, AIFF, AU, CDA	BMP, JPG, JPEG, GIF, ICO, EMF, WMF

- Table 3
  - *Sound Formats*: Admittedly, WAV files (Waveform audio file) are supported by every tool except Shell 3 (by TribeWorks). However, only half of them support MP3 file types (which can be easily distributed over the web and occupy less disk space than WAV files).
  - *Image Formats*: In this section, there is a wide range of file modalities offered; from Ovation Studio Pro (by R. I. Soft Systems) and Slim Show (by PC Whole Ware), which support only BMP and JPG files, to Media Pro (by Media Pro) which supports 32 different file types.

Table 4. Other features

	Program	Image Painting	Export	Script	3D	Animation
1	Authorware	Yes	EXE, web	Java support	No	Limited/Flash, Animated Gif, FLC/FLI
2	CBTMaster (Lessons)	No	Installation program, web	No	No	SWF
3	DazzlerMax Deluxe	Yes	EXE (install), CD, web	Java (possibly)	No	Yes (can it be imported?)
4	Director	Yes	EXE, web, BMP, AVI, MOV, DCR	Yes	Yes	Flash, Animated GIF, PowerPoint
5	EasyProf	Shapes	CD, web	No	No	Animated GIF, Flash
6	eZediaMX	Shapes	CD, MOV, web (ZIP, self-extracted, EXE)	No	No	Yes, Animated GIF, SWF, FLI/ FLC
7	Flash	Yes	EXE, web, MOV	ActionScript	No	Yes

	Program	Image Painting	Export	Script	3D	Animation
8	Flying Popcorn	Many shapes	Web, screensaver, CD	No	No	Yes, Animated GIF
9	Formula Graphics Multimedia	No	EXE, web	Java	VRML,3DS	Animated GIF, FLC, VDO, WDO
10	HyperMethod	Basic shapes	web	HM Script	No	Flash, Yes (script)
11	HyperStudio	Yes	EXE, web	Yes	No	Yes, Animated GIF
12	InfoChannel Designer	Yes	CD, web, Animated GIF, AVI	Scala script	No	FLC, FLI, Animated GIF
13	iShell 3	No	CD	?	No	SWF
14	Liquid Media	No	Exe, CD, web	Yes (possibly)	3DS, LWO, DXF	Yes, Flash, Animated GIF, FLI/FLC
15	Magenta II	No	EXE, web	MPL	3D chart	Animated Bitmap, SWF
16	MaxMedia	Shapes	EXE, CD, screensaver	No	No	Limited, Flash
17	Media Make&Go	No	Director movie (.dir)/ export via director	Yes	No	SWF
18	Media Mixer	Open system drawing tool	EXE, CD	No	No	Animated GIF, Create
19	MediaPro	Shapes	—	No	No	No
20	Mediator 7 Pro	Shapes	EXE, CD, web, Flash, screensaver	No	No	Animated GIF, SWF
21	MetaCard	Yes	EXE	MetaTalk	No	No
22	Motion Studio 3	Yes	EXE, web	No	No	Yes
23	MovieWorks Deluxe	MW Paint	AVI, MOV for 1 scene (CD autorun)	No	No	Yes (MW Animator)
24	MP Express	No	—	No	No	No
25	Multimedia Builder	Basic shapes	EXE, CD	Yes	No	Animated GIF, Flash, Move object
26	Multimedia Fusion	Yes	EXE, screensaver, web	No	Yes	Animated GIF, Yes, FLI/FLC
27	Multimedia Scrapbook	Basic	Not verified	No	No	No
28	MultimediaSuite	No	CD	No	No	Flash
29	Navarasa Multimedia 4	Yes	Exe, CD, web	Nava/Java	No	Yes/Flash
30	NeoBook	Basic shapes	EXE, web, CD, screensaver	Yes	No	Animated Gif, Yes (very few actions)
31	ODS Players	No	CD	No	No	No
32	Opus Pro	Yes	EXE, web, screen saver	Based on Java	No	Yes, Animated GIF, Flash, FLC/FLI

	Program	Image Painting	Export	Script	3D	Animation
33	Ovation Studio Pro	No	EXE	Jive	No	Load SQS
34	Platypus Multimedia Author	System tool	EXE (make autorun and installation file)	VBScript	No	Animated Gif/SWF
35	PowerPoint	Yes	Web, setup	No	No	Yes, Animated GIF
36	Presentation Publisher	No	EXE, web, screensaver, ZIP	No	No	No
37	Presentation Wizard	No	EXE	Yes	No	MNG format
38	Revolution	Yes	EXE	Yes	No	Yes (script)
39	Shelldrake Developer	Yes	CD	Yes	No	Yes
40	Slim Show	No	EXE	No	No	import (.ss)
41	SuperLink	Basic shapes, SL Paint	—	Yes	No	Limited, Animated GIF (need scripting)
42	Tactic!	Basic	CD, web	No	No	Animated GIF
43	ToolBook Instructor	Yes	EXE, web, CD (setup)	Open Script	No	Flash, Animated GIF, FLI/FLC, Yes (script)
44	TwinPlayer 3	Open system drawing tool	EXE, CD, web, AVI, MPEG	No	No	Animated GIF, Create

- Table 4
  - *Image Painting*: Most tools offer some kind of image painting (usually in the form of basic shape drawing). However, 13 of the tested packages do not offer that specific feature at all.
  - *Export*: Most packages offer some kind of file types to which you can export your editable files.
  - *Script*: Almost half of the subjects show no scripting abilities, which means that one cannot alter a presentation in a way that is not specifically supported by the package. Because of this, presentations produced by such authoring tools tend to be almost identical in interface and functionality.
  - *3D*: As shown, most packages do not accept 3D inputs except for Formula Graphics Multimedia, Liquid Media, Multimedia Director, and Multimedia Fusion.
  - *Animation*: As shown in the table, most of the multimedia tools can work with animated GIF or SWF files, while only six are completely static.

Table 5. Effects, player, and licence

	Program	Effects	Needs player	Licence
1	Authorware	Yes	No	Trial (30 days, fully functional)
2	CBTMaster (Lessons)	Yes (auto)	Yes	Shareware (fully functional, limited use of 15 times)
3	DazzlerMax Deluxe	Yes	No	Evaluation (30 days)
4	Director	Yes	Yes	Trial (30 days, fully functional)

	Program	Effects	Needs player	Licence
5	EasyProf	Yes (actions)	Yes	Shareware (30 days, fully functional, 10 pages max)
6	eZediaMX	Yes	Yes	Demo (15 days)
7	Flash	Create	Yes	Trial (30 days, fully functional)
8	Flying Popcorn	Yes	No	Evaluation (30 days, 14 pages per file, 100 frames)
9	Formula Graphics Multimedia	Yes	Yes	Shareware
10	HyperMethod	Yes (actions)	Yes	Shareware/demo (time limit)
11	HyperStudio	Yes	Yes	Shareware (fully functional, limited to 4 cards)
12	InfoChannel Designer	Yes	Yes	Trial (fully functional, 30 days)
13	iShell 3	Yes	Yes	Trial (30 days)
14	Liquid Media	Yes	No	Freeware
15	Magenta II	Yes	No	Shareware
16	MaxMedia	Yes	No	Shareware/Freeware (light edition)
17	Media Make&Go	Yes	Yes	Evaluation (limited number of pages)
18	Media Mixer	Yes	No	Evaluation (fully functional for 20 runs)
19	MediaPro	No	Yes	Evaluation (30 days, fully functional)
20	Mediator 7 Pro	Yes	No	Demo (no time limit, 5 pages per project, project expires after 7 days)
21	MetaCard	No	No (.exe)	Shareware (fully functional limited number of statements in each project)
22	Motion Studio 3	Yes	No (.exe)	Shareware
23	MovieWorks Deluxe	Yes	Yes	Trial (15 days)
24	MP Express	Yes	Yes	Trial (time limit, fully functional)
25	Multimedia Builder	Yes	No	Shareware
26	Multimedia Fusion	Yes	No	Demo (fully functional, 15 days)
27	Multimedia Scrapbook	Yes	Not confirmed	Demo (fully functional, ca not save)
28	MultimediaSuite	Yes	Yes	Shareware (30 days)
29	Navarasa Multimedia 4	Yes	No (.exe)	Shareware (30 days limit, 10 topics, 5 screens)
30	NeoBook	Yes	No	Shareware
31	ODS Players	No	Yes	
32	Opus Pro	Yes	No (.exe)	Evaluation (fully functional)

	Program	Effects	Needs player	Licence
33	Ovation Studio Pro	Yes (pages)	No	Trial (30 days)
34	Platypus Multimedia Author	Yes	No (.exe)	Trial (limited number of saved objects)
35	PowerPoint	Yes	Yes	
36	Presentation Publisher	Yes	No	Shareware (5-slide limit)
37	Presentation Wizard	Yes	No (.exe)	Shareware
38	Revolution	?	No (.exe)	Evaluation (fully functional 30 days, free edition download)
39	Shelldrake Developer	?	Yes	Freeware
40	Slim Show	Yes	No	Shareware
41	SuperLink	Yes (script)	Program needed	Trial (can not save)
42	Tactic!	No	Yes	Demo
43	ToolBook Instructor	Yes	Yes	Trial (30 days, fully functional)
44	TwinPlayer 3	Yes	No (.exe)/	Evaluation (fully functional for 20 runs)

- Table 5
  - *Effects*: No matter how high the quality, the majority of programs can work with effects.
  - *Needs player*: As seen, some tools need a player and some not. Obviously, this is of no importance if an exe file can be produced.
  - *Licence*: Most programs offer some kind of evaluation/demo trial period or even special licensing (e.g., academic) but, in fact, this lies on the buyer's identity (teacher, etc).

Table 6. GUI and other characteristics

	Program	WYSIWYG Design	Interactivity	Address	Notes
1	Authorware	Yes		www.macromedia.com	
2	CBTMaster (Lessons)	No	Yes (auto)	www.cbtmaster.com	
3	DazzlerMax Deluxe	No		www.maxit.com	Too many features
4	Director	Yes		www.macromedia.com	
5	EasyProf	Yes		www.easyprof.com	Requires Java Media Framework
6	eZediaMX	Yes	Yes	www.ezedia.com	Requires Java2 Runtime/QuickTime 5 or later

	Program	WYSIWYG Design	Interactivity	Address	Notes
7	Flash	Yes		www.macromedia.com	If QuickTime is installed, more import formats
8	Flying PopCorn	Yes		www.parasys.net	
9	Formula Graphics Multimedia	Yes		www.formulagraphics.com	
10	HyperMethod	Yes	Yes	www.hypermethod.com	
11	HyperStudio	Yes		www.hyperstudio.com	Requires QuickTime and DirectX
12	InfoChannel Designer	Yes	Yes	www.scala.com	Requires Internet Explorer Security Update for Windows 2000 and newer
13	iShell 3	Yes	Yes	www.tribeworks.com	Requires QuickTime 5.0 & above
14	Liquid Media	Yes	Yes	www.liquidmedia.net	QuickTime required for support, more files (shows banner)
15	Magenta II	Yes		www.magentammt.com	
16	MaxMedia	Yes		www.maxmediapro.com.br	Light edition not fully functional
17	Media Make&Go	Yes		www.mediamakeandgo.com	Requires Macromedia Director 7.0 or higher
18	Media Mixer	Not directly		www.cdromstudio.com	
19	MediaPro	Yes	Yes	www.mediapro2001.com	
20	Mediator 7 Pro	Yes		www.matchware.net	
21	MetaCard	Yes	Script	www.metacard.com	
22	Motion Studio 3	Yes		www.wisdom-soft.com	
23	MovieWorks Deluxe	Yes		www.movieworks.com	
24	MP Express	Yes	Time	www.bytesoflearning.com	Installation via internet no actions
25	Multimedia Builder	Yes	Good	www.mediachance.com	
26	Multimedia Fusion	Yes		www.clickteam.com	
27	Multimedia Scrapbook	Yes		www.alchemediainc.com	
28	MultimediaSuite	Yes/ No	Only forward (time)	www.multimediasuite.com	Only slide presentation
29	Navarasa Multimedia 4	Yes		www.navarasa.de	
30	NeoBook	Yes	Very good	www.neosoftware.com	NeoToon for animation

	Program	WYSIWYG Design	Interactivity	Address	Notes
31	ODS Players	Yes		www.playerssoftware.com	
32	Opus Pro	Yes		www.digitalworkshop.com	
33	Ovation Studio Pro	Yes		www.risoftsystems.com	
34	Platypus Multimedia Author	Yes		www.rgmt.com.au	
35	PowerPoint	Yes	Little	www.microsoft.com	Included in MS Office
36	Presentation Publisher	Yes	No	www.cmbsoftware.com	
37	Presentation Wizard	Yes		www.mindworkshop.com	
38	Revolution	Yes		www.runrev.com	
39	Shelldrake Developer	Yes		www.shelldrake.com	
40	Slim Show	Icons		www.pcww.com	
41	SuperLink	Yes	Yes	www.alchemediainc.com	
42	Tactic!	Yes		www.tacticsoftware.com	Demo publish only – (not fully functional), HTML, Has many quizzes
43	ToolBook Instructor	Yes	Yes	www.asymetrix.com	
44	TwinPlayer 3	Not directly		www.cdromstudio.com	

- Table 6
  - *WYSIWYG*: Every tool except for Media Mixer and TwinPlayer 3 can be programmed through WYSIWIG GUIs. This is the norm.
  - *Interactivity*: Data is inconclusive, as it is not so easy to determine if the failure to produce interactive applications lies on the user's lack of knowledge or in the program's inability to perform the task.
  - *Address*: Nothing more than the electronic address of the company or a simple download site.
  - *Notes*: Anything that does not apply to any of the previous categories.

This last table concludes the first stage of this analysis. However, the absence of educational data so far depicts an inconsistency with the title. The reason for this is simple: despite all efforts to find a purely educational software package (or at least a multimedia authoring tool that includes *some* educational functions), no significant relevant data was found, even though it was actually the primary leverage and the main purpose of this study.

In other words, in these 44 packages there were no distinguishable *educational* characteristics that could be mentioned in a table. A table column with data for a hypothetical variable "educational tools" would be redundant, since all cells would hold the same negative value.

Grading

Admittedly, grading all the programs above would be a hasty and subjective action in many ways. However, when looking for an appropriate multimedia authoring tool, a scale-based approach is needed. Following this concept, all

the grades awarded to the programs are presented in table 7 below. Note that the grades awarded in the first place (on scale of 1 to 5) do not strictly follow a numerical scale. On the contrary, they could very easily be translated as:

- 5: Excellent
- 4: Good
- 3: Adequate
- 2: Existent, however problematic
- 1: Bad
- 0: N.A. (Not Available)

Table 7. Grades

Program	Image formats	Sound formats	Video formats	Text editor	Painting	Animation	.exe	GUI	Interactivity	Web	Total
Opus Pro	5	5	5	5	4	4	5	5	5	5	48
ToolBook Instructor	5	3	5	5	4	4	5	5	5	5	46
Director	4	4	3	5	5	5	5	4	5	5	45
Flash	5	3	5	4	5	5	4	5	4	5	45
Authorware	4	5	5	5	3	3	5	4	5	5	44
Liquid Media	5	5	5	5	1	4	4	5	5	5	44
Mediator 7 Pro	4	4	4	5	3	3	5	5	5	5	43
DazzlerMax Deluxe	5	3	3	4	4	3	4	5	4	5	40
PowerPoint 97	5	5	2	5	4	3	1	5	5	5	40
EasyProf	2	3	5	4	4	1	5	5	5	5	39
NeoBook	4	3	2	5	3	2	5	5	5	5	39
Multimedia Builder	3	5	5	5	3	2	5	4	5	1	38
Motion Studio 3	5	4	0	3	4	3	5	4	4	5	37
Flying PopCorn	5	1	3	4	4	4	1	5	5	5	37
Multimedia Fusion	4	2	3	3	2	4	5	3	5	5	36
eZediaMX	5	5	5	5	3	3	1	4	3	1	35
Tactic!	4	5	5	4	3	1	1	3	3	5	34
Formula Graphics	4	2	3	3	1	4	4	3	4	5	33
HyperMethod	3	5	4	3	2	3	1	3	4	5	33
Magenta II	5	3	4	3	1	1	5	3	3	5	33
Navarasa Multimedia 4	4	3	1	2	3	3	4	4	4	5	33
HyperStudio	5	1	2	3	3	3	4	3	3	5	32
TwinPlayer 3	3	5	3	2	2	2	5	3	2	5	32

Program	Image formats	Sound formats	Video formats	Text editor	Painting	Animation	.exe	GUI	Interactivity	Web	Total
InfoChannel Designer	4	3	3	5	0	1	1	5	4	5	31
MaxMedia	2	2	3	5	3	2	5	3	4	1	30
Platypus Multimedia Author	4	5	3	5	2	1	4	1	3	1	29
Revolution	3	2	3	4	3	3	5	2	3	1	29
Media Mixer	3	5	3	2	2	2	5	3	2	1	28
MediaPro	5	1	1	5	4	1	1	5	3	1	27
MetaCard	2	2	3	3	3	1	5	3	3	1	26
Presentation Publisher	4	4	2	2	0	0	5	2	1	5	25
MovieWorks Deluxe	3	4	2	3	4	2	1	2	2	1	24
Ovation Studio Pro	1	2	4	2	2	2	5	2	3	1	24
CBTMaster (Lessons)	3	5	4	1	0	0	1	1	1	5	21
SuperLink	3	1	3	3	2	2	1	2	3	1	21
Presentation Wizard	3	2	0	3	0	1	5	3	2	1	20
iShell 3	3	1	2	3	1	0	1	2	5	1	19
Multimedia Scrapbook	4	1	1	3	2	1	1	2	3	1	19
Media Make&Go	2	2	2	2	0	0	1	4	4	1	18
Slim Show	1	2	2	1	1	2	3	2	2	1	17
MultimediaSuite	3	2	3	2	1	1	1	1	1	1	16
ODS Players	2	3	2	2	0	0	1	3	2	1	16
Shelldrake Developer	1	1	1	3	1	2	1	2	3	1	16
MP Express	2	1	2	2	0	0	1	3	1	1	13

Table 8. Statistics

Grade	Image formats	Sound formats	Video formats	Text editor	Painting	Animation	Executive	Interface	Interactivity	Web
5	12	12	9	14	2	2	19	12	13	24
4	12	5	5	6	9	6	7	7	9	0
3	11	9	14	13	11	10	1	13	12	0

Grade	Image formats	Sound formats	Video formats	Text editor	Painting	Animation	Executive	Interface	Interactivity	Web
2	6	10	10	9	8	10	0	9	6	0
1	3	8	4	2	7	10	17	3	4	20
0	0	0	2	0	7	6	0	0	0	0

Note that in Table 7 the programs are presented in order of achievement and that 100% is equal to 50. The final achievement for each program, scaled to 10, and the corresponding price (in US dollars at the time examined) are shown in Table 9:

Table 9. Grades scaled to 10 and package prices

Program	Scale of 10	Price
Opus Pro	9.6	249.95
ToolBook Instructor	9.2	2,599
Director	9	1,199
Flash	9	499
Authorware	8.8	2,999
Liquid Media	8.8	200
Mediator 7 Pro	8.6	399
DazzlerMax Deluxe	8	1,995
PowerPoint 97	8	229
EasyProf	7.8	1,105
NeoBook	7.8	199.95
Multimedia Builder	7.6	60
Motion Studio 3	7.4	39.95
Flying Popcorn	7.4	169
Multimedia Fusion	7.2	99
eZediaMX	7	169
Tactic!	6.8	390
Formula Graphics	6.6	149
HyperMethod	6.6	29.99
Magenta II	6.6	149
Navarasa Multimedia 4	6.6	29.99
HyperStudio	6.4	199.95
TwinPlayer 3	6.4	110
Infochannel Designer	6.2	359
MaxMedia	6	120
Platypus Multimedia Author	5.8	272

Program	Scale of 10	Price
Revolution	5.8	497.5
Media Mixer	5.6	75
MediaPro	5.4	99
MetaCard	5.2	995
Presentation Publisher	5	89.95
MovieWorks Deluxe	4.8	99.95
Ovation Studio Pro	4.8	399
CBTMaster (Lessons)	4.2	49
SuperLink	4.2	129
Presentation Wizard	4	30
iShell 3	3.8	495
Multimedia Scrapbook	3.8	89
Media Make&Go	3.6	399
Slim Show	3.4	49.95
MultimediaSuite	3.2	649
ODS Players	3.2	229
Shelldrake Developer	3.2	—
MP Express	2.6	49.95

Evidently, there is more to grading than merely assigning a numerical grade, even if the presented data confirms our choice of Opus Pro as the best program. Opus Pro costs approximately $250, while the programs in second and third place cost $2,600 and $1,200, respectively. However, since program grades and prices have no connection whatsoever, purchasers must decide if the price is prohibitory or not.

Therefore, these grades are merely means of comparison among packages and do not reflect the actual performance of each multimedia tool.

Statistics

Up to this point, all the data have been presented: data based on market research and an informal grading system. The data were introduced in order to extract information from the variety of existing packages; the grading system was a way to categorize packages in a more general manner. Pie charts can also clarify the data as well as make an effort to connect the data to a possible educational use of the programs.

As shown in Figure 3, Adequacy of image formats, more than 50% of the tools examined have been categorized as more than adequate. In other words, most of the programs support a total of, on average, seven or more image formats. Of course, this can be a good thing. However, it is natural to think: “What do I need so many images for?” Is *seven* perhaps unnecessary? Does it make the authoring procedure more complex? The answer is, of course, ambiguous. Nevertheless, if one were to consider the issue from the viewpoint of a high-school teacher, one would realize that it is far simpler if a program accepts any kind of image. On the other hand, if there is a different kind of controller for every kind of image, then things get more difficult and less universal. And universality is a desirable characteristic, since it leads to simplicity.

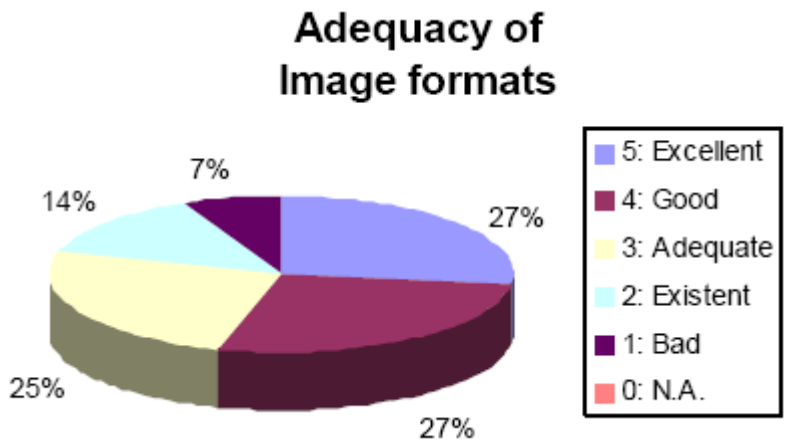

Figure 3. Adequacy of image formats (5 = Excellent, 0 = N.A.)

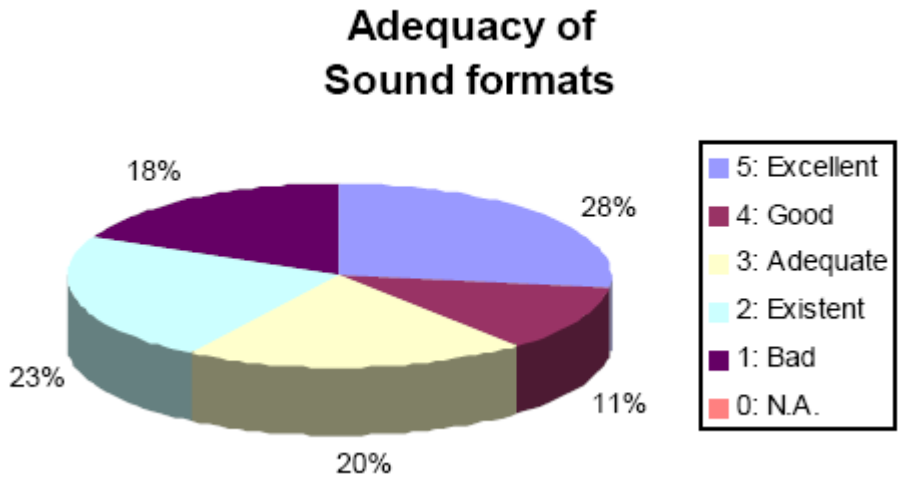

Figure 4. Adequacy of sound formats (5 = Excellent, 0 = N.A.)

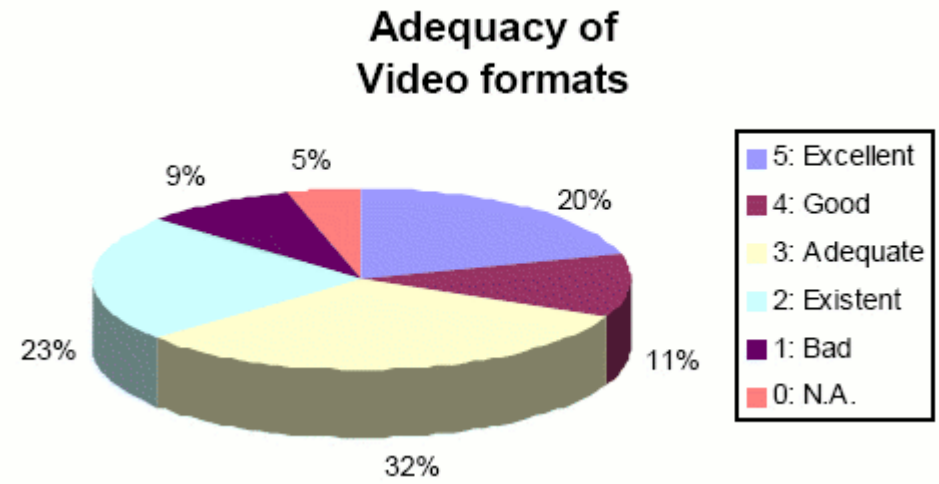

Figure 5. Adequacy of video formats (5 = Excellent, 0 = N.A.)

Approximately 27% of all packages have more than five sound formats that can be imported into the multimedia content (Figure 4). A mere 11% work with only four sound extensions. Of course, in the above, one can only suppose that the files supported are popular ones, e.g., MP3, WAV, etc., and not file types that are rarely introduced.

The percentage of 4.55% (Figure 5) corresponds to Motion Studio 3 and Presentation Wizard, which offer no video imports whatsoever. On the other hand, seven packages support between four and eight different video file types, which is more than efficient in most cases.

With regard to text editing, Figure 6 demonstrates that one in three packages offer good text opportunities. Of course, some packages don't offer such opportunities: Slim Show supports only one-line editing, while CBT Master (Lessons) contains a text editor but does not allow importing, which would prevent a teacher from importing text from one program to another.

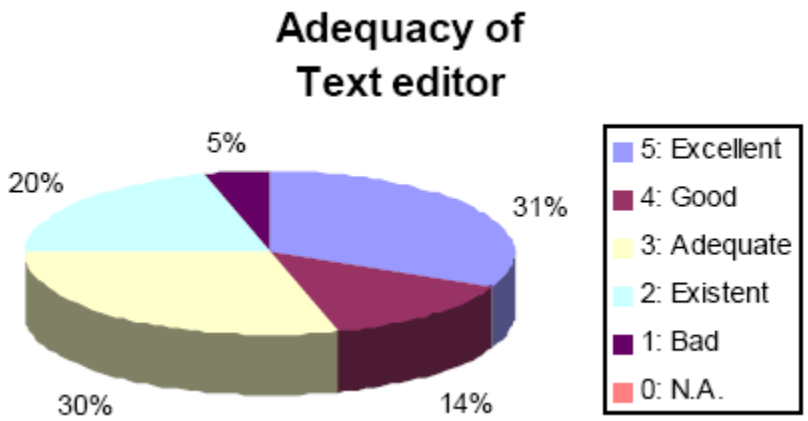

Figure 6. Adequacy of Text editor (5 = Excellent, 0 = N.A.)

As far as painting is concerned (Figure 7), statistics are a cause for pessimism: In 32% of the packages, the user is not allowed to adequately paint anything. On the other hand, Macromedia products save the day, as the only tools graded as "Excellent" were Director and Flash. But, considering it from the educator's point of view, how easy is it for one to learn how to use a Macromedia package just to make a small multimedia presentation in class?

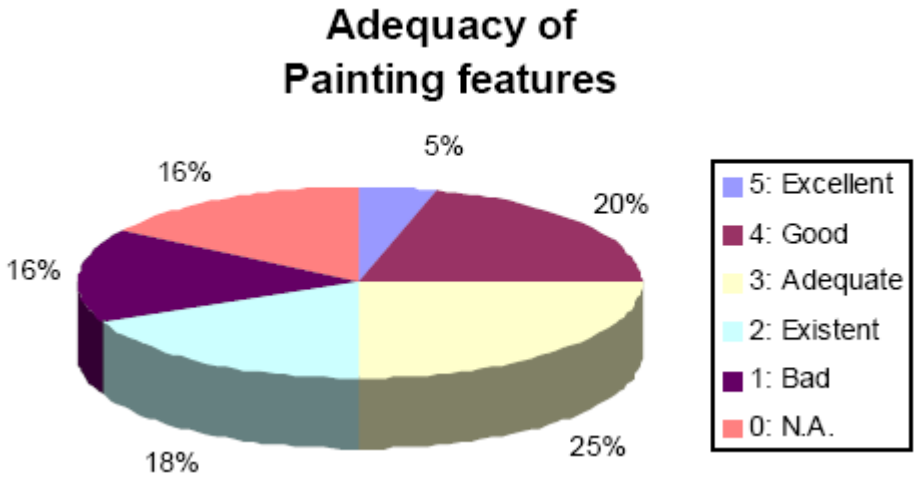

Figure 7. Adequacy of painting features (5 = Excellent, 0 = N.A.)

Animating objects, pictures, etc., is universally held as the most valuable tool when it comes to multimedia. Therefore, it is most unfortunate that only two software projects (again Director and Flash) offer good animation capabilities, while 59% are just above average (Figure 8). A true waste of computer power! Features like animation drive people to the use of PCs. If there are no animation capabilities, then most of the rest can be done with a common overhead projector and a marker.

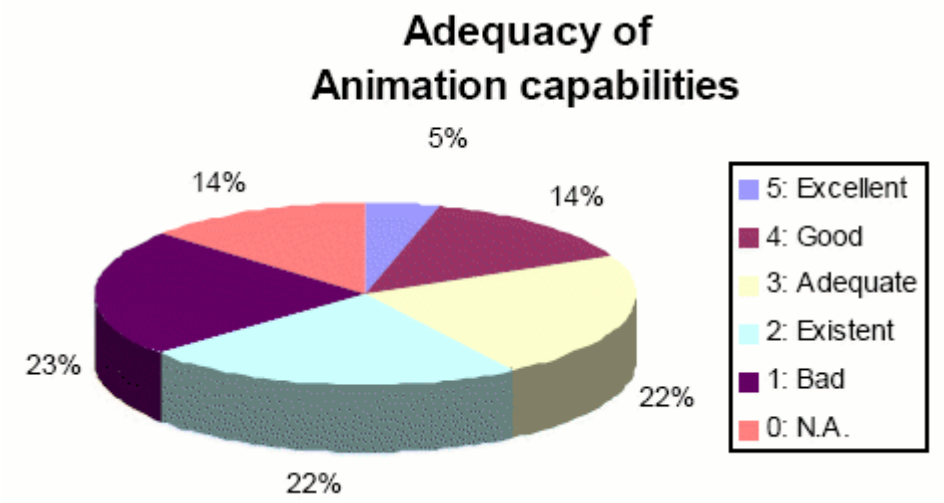

Figure 8. Adequacy of Animation capabilities (5 = Excellent, 0 = N.A.)

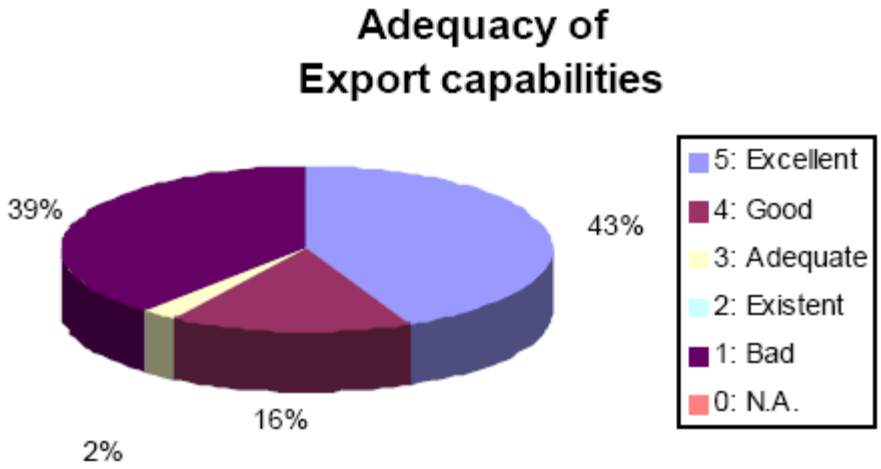

Figure 9. Adequacy of export capabilities (5 = Excellent, 0 = N.A.)

The statistics in Figure 9 speak for themselves: Only 60% can produce a file that can run independently of the whole program. In addition, only 27 out of 44 programs can produce EXE exports. A definitely pessimistic percentage, since most school computers cannot be administered by the teacher alone; it is then natural that a software package cannot really be used by the teacher (when preparing the class) if the same program has to be installed in the classroom computer or in every lab PC.

Truly, a decent interface is important to any multimedia authoring tool. Of course, what constitutes a "decent interface" is highly subjective. Nevertheless, there are unbiased factors that can be measured, such as WYSIWYG design, colors, etc. Fortunately, a proper GUI environment exists in 74% of the programs (Figure 10).

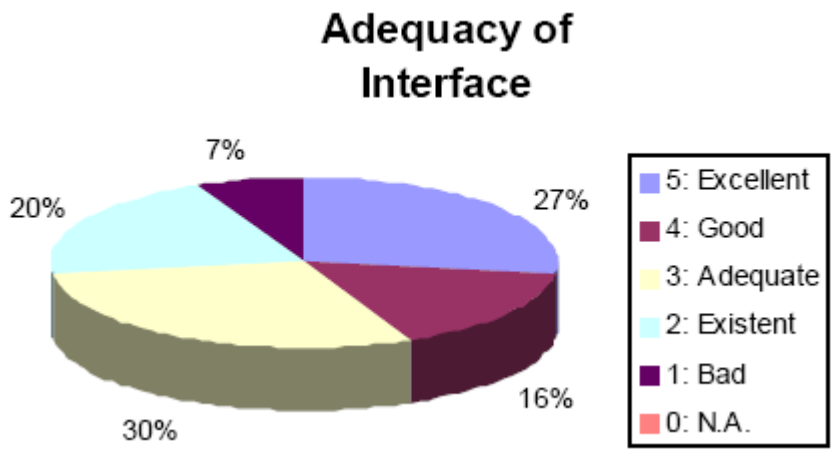

Figure 10. Adequacy of Interface (5 = Excellent, 0 = N.A.)

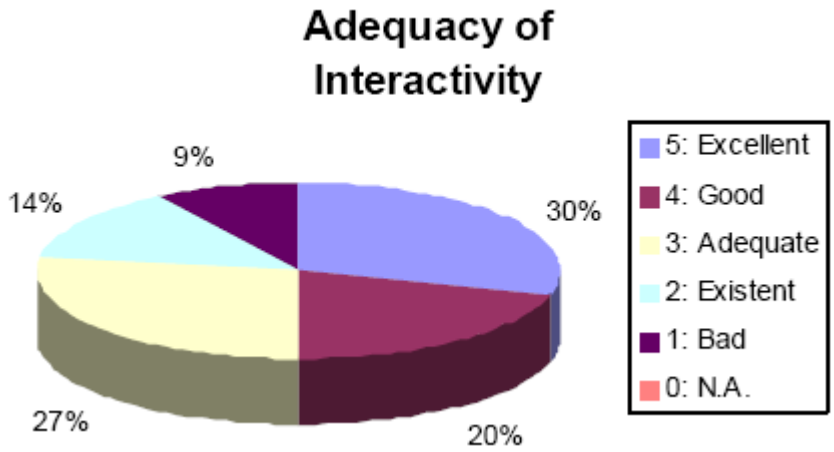

Figure 11. Adequacy of Interactivity (5 = Excellent, 0 = N.A.)

Regarding the web, parallel to the latest evolutionary tactics in the www, some programs mutated themselves in order to be able to act as network platforms that allow users to communicate. This allows file projection or exchange between the two (or more) ends. The situation in the field of multimedia can be seen in Figure 12.

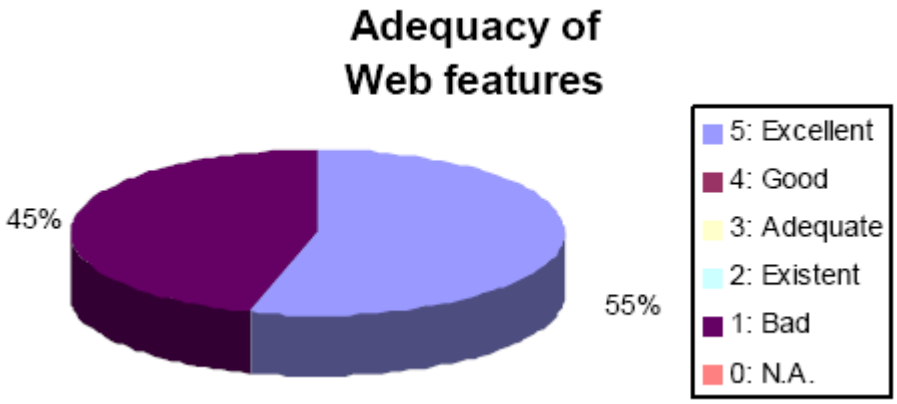

Figure 12. Adequacy of web features (5 = Excellent, 0 = N.A.)

Educational overview

Having taken many factors under consideration, a top seven list has been extracted:

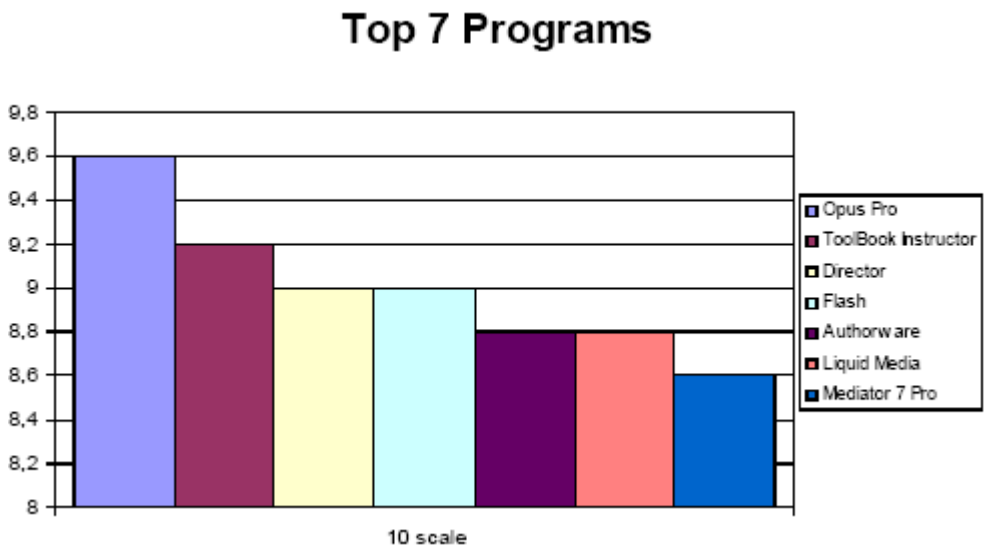

Figure 13. Best programs reviewed

It is true that the only thing clear after all this fuss about finding the best multimedia tool for the job is this question: "What job is it intended for?" Figure 13 shows the outcome of the search: the best 7 programs, according to the grades given by the authors. However, let's examine the facts about these packages a little more closely (Table 10):

Table 10. Top seven programs: data

Program	Image formats	Sound formats	Video formats	Price
Opus Pro	12	5	8	$249.95
ToolBook Instructor	17	3	5	$2,599
Director	10	5	3	$1,199
Flash	17	3	6	$499
Authorware	4	5	5	$2,999
Liquid Media	24	16	7	$200
Mediator 7 Pro	8	4	4	$399

It is easy to spot the paradox of Liquid Media: While supporting a vast number of imports of any kind, it holds only sixth place! However, what cannot be stated in this article due to limited space is that some programs present other issues that need to be resolved. For example, Liquid Media does not offer any kind of image painting, which is very crucial to the authors for without it the user cannot draw a single line; instead, everything has to be drawn using other programs and imported as an image.

Therefore, it is only natural that some facts on the grading table seem strange. In order for someone to have a perfectly clear image of what the program can or cannot do, all programs have to be installed and reviewed individually. Due to presentation limitations, in this paper two programs appear to offer scripting languages regardless of their nature and difficulty. In reality, however, a package that supports scripting in a programming

language used 20 years ago is far more difficult to program than a tool that accepts visual programming and can be used by a non-IT professional.

But let's review something stated so many times previously: What about the educational side of the above programs? Shouldn't a special analysis be held for that aspect only? As has already been mentioned, none of the above programs has something specific to offer when it comes to education (except perhaps ToolBook Instructor).

In other words, there is no multimedia authoring tool specially designed to offer education professionals a chance to facilitate entire lessons with multimedia presentations. In order to be universal, an educational multimedia authoring tool has to have, in addition to the points stated above, two basic virtues:

- Low price: Keeping in mind the fact that most educational institutions cannot afford the cost of a single software package (except perhaps gigantic educational institutions), the perfect educational multimedia authoring tool has to be cheap enough for a schoolteacher, a parent, or even a student to buy.
- Ease-of-use and a friendly GUI (Preclik, 2000): No one can possibly buy a program that requires two months' full-time work to produce a single executable file. Therefore, creating multimedia presentations should be easy enough to learn in a single weekend or less, regardless of the user's skills and academic status.

The underlying problem is that all the programs examined in this review were developed with a target audience of users in a universal market. Unfortunately, that same universality works against the programs when it comes to the sensitive field of education: It would be rare for a primary-school teacher to care about all the capabilities that Macromedia Flash has to offer, no matter how fascinating these may be or how small the Shockwave export file is (Lim, 2001). All that one needs for the educational purposes that arise in a classroom is a simple program that can perform all the basic tasks in a very easy way. More complex tasks could be hidden somewhere below the superficial layer of the interface so that a teacher that needs only basic program features shouldn't be overwhelmed by them.

Summary and Conclusions

"The task of creating a multimedia presentation is multileveled and time-consuming" (Bulterman & Hardman, 2005). Despite that, all the tools available in the market offer a vast variety of work environments to choose from. However, in the eyes of a novice, this fact represents a big obstacle: "What program am I supposed to select? How can I learn how to use it and how much money must I spend learning the program?" Having all this in mind, it is only natural to feel the urge to cut back on the previously stated two factors. In other words, users should look for a program that allows better results to be produced in less time and, of course, for less money.

In this quest, the present survey began by giving a detailed analysis of the historical background of the multimedia field. From traditional programming languages and more recent authoring languages, the whole thing gradually settled on authoring systems, since they offered a more simplified presentation of the concept. In spite of the consequent cut-back on capability, universality, and power, authoring systems became very popular — especially among people with little computer knowledge and no desire to spend time learning programming languages. This fact created a large market for multimedia authoring tools, which naturally led to the creation of similar programs by many companies.

In this survey, 44 packages were identified and properly installed for a full review. For these systems to be evaluated, a group of relatively strict criteria had to be determined, since the whole examination was based on them. These factors were many, varying from package price to number of files supported.

After presenting the data collected, the next target was to impose a grading scale, which provided the basis for the final list. The outcome was scaled to 10 and was presented along with the corresponding price in order to give a more clear view of the cost-benefit relationship. This led to the extraction of a set of statistics and some thoughts regarding the total results. The results are not absolute. On the contrary, they indicate the pros and cons of every aspect so that a deduction can be made by the individual buyer.

Finally, the above data were compressed into a top-seven program list and analyzed from an educational point of view, which led to the deduction that not one tool from the ones analyzed has something special to offer in an educational environment.

In summary, the final outcome is that looking for a multimedia tool is very challenging. The interested individual must judge which feature is a "must-have" and which is mere luxury. As analyzed in the body of the paper, detailed statistics fail to reveal a suitable candidate for our interests. Packages that support numerous image, sound, or video formats, along with text editor and animation capabilities, are not oriented towards the average computer-literate educator. Furthermore, many of the examined programs do not allow the production of autonomous, self-executable, directly distributable applications.

Despite the detail of our study, only one sector has not been covered, yet: the educational sector. And that is because no serious educational features have been found in any of the programs examined in order to comment on that. This is a real pity, given the fact that education is the primary field that could benefit from the use of multimedia computing; lessons, interactive courses, multimedia tutorials, and much more. But, in order for that to be feasible, there has to be a relatively cheap and easy way to produce everyday applications for classroom use.

Therefore, it is natural to ask: Why hasn't a purely educational multimedia authoring tool been developed yet? Why has no part of the open-source community (since purely commercial products cannot easily cover the certain need, as mentioned above) moved in that direction?

Unfortunately, there is an obvious gap in the educational field: a variety of needs can be only partially filled by existing multimedia packages (and a lot of personal sacrifice, both in time and money, is still required). This is not to say that the existing software is of low quality, merely that it is unable to serve a purely educational aim.

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