

Comparison and Recommendations for Low-Cost Digital Video Recorders in Early Intervention and Early Care and Development

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Which low-cost digital video recorders are best for use in professional development, technical assistance, supervision, coaching, and service delivery activities? There are many good choices and new brands and models appear very frequently and current models are updated or discontinued all the time. The model that will be best for you depends on your purposes for using video and the features that you need or want. The chart below might help you get an idea of which features are most important to you.

Features to Consider	Why These Features Might Matter
Format	Decide if you want/need SD (standard definition) or HD (high definition). HD has a better image but also much larger file sizes. Some camcorders allow you to shoot either format – <u>this is a very desirable feature</u> .
Video compression	Find out what video format the camcorders record in and if that format suits your needs for your end product, editing, posting, and playing. Not all formats work equally well on PCs and Macs. And not all formats can be imported into the video editing software that you like to use; you may need to transcode file formats or choose a different editing application. The most common formats lately seem to include .mp4 and .mov, and less often .avi.
Record in different file sizes	Some camcorders just have one setting. Other camcorders let you choose between two or more file sizes, so you can choose the largest size for high-end productions, such as when your final product will be a HD DVD and smaller sizes for posting on the web, emailing, etc. Being able to choose the file size <u>is a very desirable feature</u> .
Battery	Does the camcorder come with its own unique type of battery (e.g. rechargeable lithium) or can you use batteries that can be readily purchased anywhere? Which do you prefer?
Rechargeable battery	Some camcorders use rechargeable batteries and some use disposable batteries. Each has its own advantages and disadvantages. Figure out what works best for you. If the batteries are rechargeable, find out how to recharge them, e.g. through an external charger or by plugging the camcorder into your computer. If you recharge by plugging the camcorder to a computer, you can't use the camcorder while the battery is charging. If the camcorder uses a rechargeable battery, you might want to buy a spare so that when your battery loses its charge you have another to replace it before you can get around to recharging.

Features to Consider	Why These Features Might Matter
Tripod port	<u>This is an essential feature.</u> You need this port on the bottom of the camcorder so you can screw it into a tripod.
Zoom	Very important so you can capture the action without being obtrusive. All of the camcorders in this class offer digital rather than optical zoom. The higher the zoom, the better. In this class of recorders, the range of zoom is usually between 0 and 5x. Try to get a camcorder with at least 4x zoom. <u>The higher the zoom the more flexibly you can use the camcorder.</u>
Storage	Amount of internal and external memory. All camcorders come with internal memory but not all have removable external memory cards. Having removable storage is a very important feature, especially if two or more people will be sharing the camcorder. I recommend that you purchase a camcorder that uses removable SD cards if it will be shared; that way, each user can have her or his own card. When the camera is transferred from one person to the next, you can simply remove your card to avoid loss of files. <u>Removable SD cards are very desirable features.</u>
Storage capacity	Storage capacity refers to how much video (measured in length of time or bits of data) can be stored in the camcorder before needing to transfer the video files to another storage device. Camcorders that record in different file sizes will have variable storage capacity depending on the size of video recorded. Storage capacity can vary due to factors such as color saturation and the complexity of what you record, e.g. movement of the subject being recorded.
File size of one minute of video	This is the size of one minute of video. File size matters for storage and portability. It also might matter if you plan to email a file or upload it to a system that has size limitations. You can use software to compress the file to a smaller size, but that adds an additional step and also lessens the quality of the clip. In my recent test of about 10 camcorders in this class, the file size of one minute of video varied from 4 MB to 127 MB.
Take still photos	Some camcorders enable you to also take still photos while others don't. If you want to be able to take still photos, definitely choose a camcorder with a dedicated still photo function. With some camcorders you can capture a frame of video as a still, but please note: a photo captured from a frame of video is not of high quality.
Manual lighting settings	Also referred to as exposure controls. Some camcorders enable you to switch the lighting settings so that you will get better results in different situations, e.g. indoors, outdoors, etc. while other camcorders use only one automatic setting that adjusts (theoretically) to various lighting conditions.
Display monitor size	This is the size of the viewer.
Does the display monitor swivel	This indicates whether or not the display can be rotated in various directions so that the videographer can shoot from different angles or so that a person being shot can monitor themselves. This is a very important feature if you will be included in the action. By using this feature you can easily see if you are capturing what you want to capture. Without it, it's hit or miss. <u>A swivel display is an extremely desirable feature.</u>
Editing software	Find out if the camcorder comes with its own editing software (this is not essential because there are plenty of free and low-cost software applications available). If so, does editing happen inside the camcorder or on a computer? Almost all camcorders can download files to both Macs and PCs, but not all of the editing

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	software that comes bundled with the camcorders works on both platforms.
Minimum illumination for video clip	This tells you how well the camcorder will capture good video in dark settings. The lower the better.
Accessories included	This lists what come in the box. In addition, the camcorders come with some level of a getting started guide and some come with detailed manuals. In addition to what comes in the box you can buy optional accessories.
Price	Expect to pay between \$100 - \$220, plus shipping, tax, and extra accessories.

Camcorders tested for this version of this document

	Sanyo Xacti VPC-CG20 Amazon price on 8/21/11: \$139
	KODAK PLAYTOUCH Video Camera (Model Zi10) Amazon price on 8/21/11: \$112
	3m Shoot 'n Share Amazon price on 8/21/11: \$221
	Toshiba Camileo 30 Amazon price on 8/21/11: \$94
	Zoom Q3 Handy Digital Camcorder Video Recorder Amazon price on 8/21/11: \$120
	Sony Bloggie Touch Camera 8 GB 4 hours Amazon price on 8/21/11: \$198

The Specs

Specs	Sanyo Xacti VPC-CG20	KODAK Zi10	3m Shoot 'n Share	Toshiba Camileo S30	Zoom Q3	Sony Bloggie Touch
Format	HD and SD .mp4	HD and SD .mp4	HD and SD .mp4	HD and SD .mp4	SD .mov	HD and SD .mp4
Compression	MPEG-4 AVC/H.264 (.MP4)	MPEG-4 H.264	MPEG-4 H.264	MP4 (H.264)	MPEG4-SP	MPEG-4 H.264
Records in different sizes?	Y, Full-HD: 1920 x 1080 (60 fields / sec., 16 Mbps), Full-SHQ: 1920 x 1080 (30 fps, 12 Mbps), HD-HR: 1280 x 720 (60 fps, 12 Mbps), HD-SHQ: 1280 x 720 (30 fps, 9 Mbps), TV-SHQ: 640 x 480 (30 fps, 3 Mbps)	Y, 1080p (1920 x 1080, 30 fps); 720p/60 fps (1280 x 720, 60 fps): 720p (1280 x 720, 30 fps); WVGA (848 x 480, 30 fps)	Y, 720p (1280x720), DVD (720x480), VGA (640x480), QVGA (320x240)	Y, FHD (1080p/30fps), HD (720p/30fps), HD (720p/60fps), VGA (480p/30fps)	N, 640 x 480, 30 fps	Y, 12M 1920x1080 (29.97p): 40 min. 6M 1280x720 (59.94p): 80 min. 4M 1280x720 (29.97p): 120 min.
Battery type	Lithium-ion	KODAK Li-Ion Rechargeable Digital Camera Battery KLIC-7004	Embedded rechargeable Li-Polymer battery	Li-Ion rechargeable battery,	(2) AA batteries Optional: two AA-sized Ni-MH rechargeable batteries with dedicated charger, or an AC adaptor	Internal (NP-SP70 3.6V)
Rechargeable battery?	Y. Comes with external charger	Y. Comes with adapter for charging battery in the camera	Y, Comes with adapter for charging battery in the camera	Y,	Optional	Y. By plugging into a computer
Video Recording Time between charges	Approx. 1 hr in full HD	Not specified	Up to 120 minutes	Not specified	Up to 2 hrs	Not specified
Tripod Port	Y	Y	Y, but set up for projecting	Y	Y	Y, vertical only
Zoom	Approx. 12x digital	4x digital	Y, not specified	16x digital	2X digital	4x digital
Storage	Internal: 30 MB	Internal: 128 MB External:	14MB internal memory and	128MB Nand Flash	External: SDHC	Internal : 8GB Flash

Specs	Sanyo Xacti VPC-CG20	KODAK Zi10	3m Shoot 'n Share	Toshiba Camileo S30	Zoom Q3	Sony Bloggie Touch
	External: SDHC Memory Card (Up to 32 GB SDHC Memory Card)	SDHC memory card (4GB-32GB)	microSD™ card slot up to 32GB for storage	Memory with Up to 64GB SD/SDHC/SD XC	memory card (4GB-32GB)	Memory
Storage capacity (as reported by manufacturer)	1 - 4 hours of video with a 8GB SDHC memory card, 4 - 16 hours of video with a 32GB SDHC memory card	about 20 min per 1 GB at 720p HD at 30 fps	Up to 20 hours with a MicroSD 32GB	Per 1 GB SD: VGA (480/30fps)=60 min, FHD (1080p) = 10 min, HD (720p/30fps)=20 min	Up to 16 hours of video with a 32GB SDHC memory card	4 hours
Take still photos	Y, 12 MP	Y, 5.3 MP, 16:9 widescreen, interpolated	Y, 3, 5, and 8 MP	Y, 3MP (2048 x 1536), 8MP (3264 x 2448), 16MP (4608 x 3456)	Y, 3 MP	Y, 12 MP; 16:9: 8.3M (3840 x 2160); 2M (1920 x 1080)
Record audio only	Y	N	N	N	Y	N
External stereo microphone jack	N	Y	N	N	N	N
Headset output	N	Y	Y	N	Y	N
Lighting settings	Auto and manual	Auto	Auto	Auto and manual	Auto	Auto
Display monitor size	2.7 "	3" touch screen	2.4"	3" touch screen	2.4 "	3" touch screen
Does display monitor swivel?	Y	N	N	Y	N	N
Come with editing software?	Y	Y, PC only	N	Y, PC only	Y, PC only	Y
Notable Features	Swivel Display	Has input for an external microphone	Can project image 12-14 lumens	Swivel Display	N	N
Accessories included	USB Cable, AV Cable, Li-ion Battery, Lens Cap, Li-ion Battery Charger, manual	Li-Ion Rechargeable Digital Camera Battery KLIC-7004, HDMI and AV cables, wrist strap, User Guide, ARCSOFT MEDIA IMPRESSION Software (PC)	Quick Guide, AV cable, AC Power Adapter, USB cable	Mini Tripod, Li-Ion rechargeable battery, USB cable, AV Cable, CD (ArcSoft video and photo editing software, User's Guide, warranty information),	2 AA Ni-MH batteries, AV cables, wrist strap, soft pouch, windscreens, 2 GB SD card	USB connection support cable, wrist strap

Specs	Sanyo Xacti VPC-CG20	KODAK Zi10	3m Shoot 'n Share	Toshiba Camileo S30	Zoom Q3	Sony Bloggie Touch
		only)		Hand strap, Cleaning cloth, Quick start guide, Nylon Case, HDMI cable, Power Adapter		

File Formats, Sizes, and Media Players for PCs and Macs

Specs	Sanyo Xacti VPC-CG20	Kodak Zi10	3M Shoot 'n Share	Toshiba Camileo S30	Zoom Q3	Sony Bloggie Touch
File type	.MP4	.MP4	.MP4	.MP4	.MOV	.MP4
File size of one minute of video on a PC (+/- 2 seconds)	FullHD 124.1 MB	1080p 121.2 MB	720p 51.4 MB	FHD 69.7 MB	31.9 MB (with audio set on mp3 128kbps auto)	1080-30p 85.1 MB
	FullSHQ 101.1 MB	720p/60 fps 98.6 MB	DVD 19.6 MB	HD60 61.7 MB		720-60p 41.3 MB
	HDHR 90.5 MB	720p 62.2 MB	VGA 34.5 MB	HD30 35.4 MB		720-30p 30.5 MB
	HD SHQ 71.2 MB	WVGA 28.5 MB	QVGA 4.7 MB	VGA 14.1 MB		
	TVSHQ 25.9 MB					
File size of one minute of video on a Mac (+/- 2 seconds)	FullHD 127.1 MB	1080p 124.1 MB	720p 52.7 MB	FHD 71.4 MB	32.7 MB (with audio set on mp3 128kbps auto)	1080-30p 87.2 MB
	FullSHQ 103.5 MB	720p/60 fps 101.1 MB	DVD 20.1 MB	HD60 63.3 MB		720-60p 42.3 MB
	HDHR 96.8 MB	720p 63.8 MB	VGA 35.4 MB	HD30 36.3 MB		720-30p 31.3 MB
	HD SHQ 72.9 MB	WVGA 28.7 MB	QVGA 4.9 MB	VGA 14.4 MB		
	TVSHQ 26.5 MB					

Media Players

All video files produced by all of these camcorders can be viewed on both PCs and Macs using these free media players:

QuickTime Player: <http://www.apple.com/quicktime/>

VLC Media Player: <http://www.vlcmediaplayer.net>

Basic Editing, Compression and Transcoding

All video produced by all of these camcorders can be viewed, trimmed, joined, compressed, and transcoded on both PCs and Macs using:

MPEG Streamclip: <http://www.squared5.com/>

My recommendations (at least for today)

There are many fine choices for digital video recorders in the \$100-\$200 price range and the choices change all the time. But if I were pressed to make some recommendations today, based on the camcorders that I tested, I would recommend the following.

Best All-Around: Sanyo Xacti VPC-CG20

I recommend the Sanyo Xacti VPC-CG20 as the best all-around camcorder for early intervention and early care and education practitioners. Why? Because it is the only camcorder that I have tested to date that has ALL of the key features that are essential TO ME:

- It works well with PCs and Macs.
- It uses a removable SD card expandable to 32 GB so that providers can share the camcorder, but maintain their own storage devices.
- It has one of the largest display monitors of all of the camcorders that I tested, plus it is the only one of the bunch with a swivel display (a very useful feature).
- It can record in 5 video file sizes, including one SD setting and four HD settings.
- It has 12x optical zoom, the highest of the entire bunch.
- It does not produce the best video or the best audio compared to the other camcorders tested, but the quality is good enough for most purposes. If the best video and audio qualities are the most important features for you, read below.
- It produces MP4 files using AVC/H.264 compression and edits well on PCs and Macs.
- It takes good still photos.
- It can record audio only.
- It has decent battery life and uses rechargeable batteries that are recharged using an external charger, so you can use the camcorder while charging a spare battery.
- It has a variety of preset lighting settings.
- You can edit video right in the camcorder or with your own editing software.

Best Audio: Zoom Q3 or Kodak Zi10

If you are looking for the best audio in this class with a built-in microphone, choose the Zoom Q3. The Kodak Zi10 comes in second for audio and is also the only camcorder in this class with a jack for an external microphone which could be a very important feature for you.

Coolest Feature:

The 3m Shoot 'n Share is a camcorder AND a mini-projector and can project images on a wall or screen in a darkened room.

Newcomer to Check Out:

The Toshiba Camileo S30 made it to my test bench for the first time recently. Although I still have to do some more testing of it in action, I am very impressed by the quality, features, and the price.

A Wearable Camcorder?:

I tested out the Looxcie Wearable Camcorder. It sits on your head like a headset and records to your cell phone. Great idea, but the quality isn't there yet. <http://www.looxcie.com/>

Useful accessories:

Most come with a wrist strap and, when needed, a lens cap. Other accessories come standard with some models but are optional with others – be sure to read the descriptions of “what comes in the box”). Here are things you may need:

- Tripod
- Extra and/or larger SD card
- Padded carrying case
- Spare rechargeable battery and/or battery charger
- AC power module
- Editing software

Lastly, What About Using Mobile Phones?:

Many providers are using their cell phones for recording video, photographs, and text notes.

Examples can be found:

http://www.cde.state.co.us/resultsmatter/RMVideoSeries_UsingTechnology.htm#top

Please remember:

This document reviews only a handful of camcorders in the \$100-\$200, point and shoot, drag and drop files class. If you want higher quality video or more features you may very well want to move up to the next class of camcorders. A good guide for purchasing camcorders based on class of equipment and cost can be found at:

<http://reviews.cnet.com/camcorder-buying-guide/>