Telehealth Technology Assessment Center

Digital Camera Selection for 2010

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TTAC
Methods

- Market Identification of All Cameras
- Market Review Selection
- Hands-On Evaluation
  - Mechanical Review
  - Image Quality Review
- Feature Analysis
- Final Selection
Methods

- Market Identification of All Cameras: 90
- Market Review Selection: 9
- Hands-On Evaluation
- Feature Analysis
- Final Selection: 1
Market Identification and Market Review – – Sources – –

- Internet sites of manufacturers, distributors, and camera review websites
- Available literature, magazines, specification lists, camera instruction manuals
- Visits to local retailers
MARKET REVIEW

What’s out there?

We like:
- Manufacturer web sites
  - www.imaging-resource.com
  - www.neocamera.com
  - www.dpreview.com
  - www.myproductadvisor.com/mpa/home.do

Read
- Internet
- Emails

Talk
- Local camera store
- Other users

Try
- Box stores
- Friends, colleagues
Market Identification

- All point-and-shoot cameras under $400 that have macro capability and are newly available after January 2010 (thru July 2010)
- Includes Canon, Casio, Fujifilm, Kodak, Nikon, Olympus, Panasonic, Pentax, Samsung, and Sony
- Not: SLR-like cameras nor water cameras
## Market Review – Selection Criteria

- Identified 90 Digital Cameras on the Market

<table>
<thead>
<tr>
<th>Canon</th>
<th>Casio</th>
<th>Fuji</th>
<th>Kodak</th>
<th>Nikon</th>
<th>Olympus</th>
<th>Panasonic</th>
<th>Pentax</th>
<th>Samsung</th>
<th>Sony</th>
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<tbody>
<tr>
<td>A490</td>
<td>EX-Z2000</td>
<td>JV100</td>
<td>M575</td>
<td>L110</td>
<td>9010</td>
<td>DMC-ZR3</td>
<td>H90</td>
<td>HZ30W</td>
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<td>A495</td>
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<td>L22</td>
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<td>A3100 IS</td>
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<td>Z70</td>
<td>SLICE</td>
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<td>S6000</td>
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<td>DSC-TX5</td>
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<td>DSC-H55</td>
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<td>DSC-TX9</td>
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<td></td>
<td>DMC-FX75</td>
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</tbody>
</table>
Market Review

- Need to narrow the field to one camera per manufacturer
- Need requirements and criteria for camera selection
- Allow us to move from Market Review to Hands-On Review
Basic Requirements

- Users: Basic to advanced, point-and-shoot, low to high volume use
- Clinical applications: Multiple, i.e., Skin, face, wounds
- Auto mode: Mostly utilized
- Macro: Frequent use
- Image Quality of High Importance
- Ease-of-Use of High Importance
Further Selection Criteria

Positive Attributes

- Overall ergonomics, intuitive buttons, auto mode accessibility & reliability, macro capability closer than 10 cm, auto macro, standard image storage, bright LCD, high definition video, and overall good reviews

Negative Attributes

- Less–durable materials, cheap–looking entry–level cameras, small size (hard to grip), and very small buttons, poor finger positioning
Market Review – Selection Process

We researched the cameras and examined some in-person, at stores. We spoke with others. The Basic Requirements and Selection Criteria guided our decision making process. We selected one top camera from each of the ten manufacturers.

Limitation
There could be another good camera that did not make it to the “hands-on” review
Market Review Selection – 2010 Cameras –

- Canon PowerShot SD3500 IS
- Casio EXILIM EX-FH100
- Fujifilm FinePix F80EXR
- Kodak EasyShare M580
- Nikon Coolpix S8000
- Olympus Stylus-7040
- Panasonic Lumix DMC-ZS5
- Pentax Optio H90
- Samsung HZ35W

...On to the Hands-On Review!
Hands-On Evaluation

- Mechanical Review (Ease-of-Use, etc.)
- Image Quality Review
- Feature Analysis and Final Camera Selection
Can the end-user understand the controls sufficient to take good pictures?
  ◦ e.g. What are the training requirements?
  ◦ e.g. Can it easily take high quality macro images?

Things to consider:
  ◦ Macro Mode
  ◦ Flash
  ◦ Size
  ◦ Batteries and Power Charging
  ◦ Image Transfer
Mechanical Review

- Mechanics
  - Overall feel
  - Accessibility of ports
  - Accessibility of battery
  - Accessibility of memory card
  - Overall appearance
  - Material
  - Durability
  - Button layout
  - Appropriate size

Score 1 thru 5, where
1 = Poor (Worst), 2 = Fair,
3 = Good, 4 = Very Good,
5 = Excellent (Best)
Mechanical Review

- **Ease-of-Use**
  - On/Off
  - Auto Mode
  - Scene Mode
  - Video Mode
  - Macro
  - Flash
  - Settings Menus
  - Image Review
  - Image Delete
  - Take a photo – auto
  - Take a photo – macro

*Score 1 thru 5, where 1 = Poor (Worst), 2 = Fair, 3 = Good, 4 = Very Good, 5 = Excellent (Best)*
Mechanical Review

- **Macro**
  - How close you can get?
  - Ease of macro on/off?
  - Super macro required?
  - Does auto provide macro?

- **Image Transfer**
  - Memory Card
  - Ease of USB Transfer
  - USB Cord – Sturdy
  - Standard USB Cord (Non-propr.)

- **Power**
  - Battery type
  - Battery Number
  - Battery charger type
  - Charge in-camera c USB?
  - Charge in-camera c AC power?
  - Advertised # photos per charge

*Informational; No Likert Score*
Four cameras scored highest: Fuji F80 EXR, Samsung HZ35W, Panasonic DMC–ZS5 and Nikon S8000.

Reviewers' general impressions that these are four intuitive cameras that are comfortable, offer good functionality and seem reliable.

The other five cameras scored lower for various reasons and are not recommended for the average clinical user.
# Other considerations

How does the “Out of Focus” indicator work?

<table>
<thead>
<tr>
<th></th>
<th>Canon SD3500</th>
<th>Casio FH100</th>
<th>Fuji F80EXR</th>
<th>Kodak M580</th>
<th>Nikon S8000</th>
<th>Olympus 7040</th>
<th>Panasonic DMC-ZS5</th>
<th>Pentax H90</th>
<th>Samsung HZ35W</th>
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</thead>
<tbody>
<tr>
<td><strong>In-Focus</strong></td>
<td>Green Box</td>
<td>No</td>
<td>Green Box</td>
<td>Green Box</td>
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<tr>
<td><strong>Out-of-Focus</strong></td>
<td>No</td>
<td>Red Box</td>
<td>Red !AF</td>
<td>Red AF</td>
<td>Flash Red Box</td>
<td>Flash Red Box</td>
<td>Red camera *</td>
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<td>Red Box</td>
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<td>(Visual)</td>
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<td><strong>Out-of-Focus</strong></td>
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<td>No beep</td>
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</tr>
</tbody>
</table>

* Plus Focal Range Green dot flashing
Why Macro?

... allows for closest approach to subject

Kodak V1233 with Macro

Kodak V1233 without Macro
## Trends for 2010  
--- Auto Macro ---

<table>
<thead>
<tr>
<th>Camera</th>
<th>Auto Macro</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canon SD3500</td>
<td>Yes</td>
</tr>
<tr>
<td>Casio FH100</td>
<td>Yes, But*</td>
</tr>
<tr>
<td>Fuji F80EXR</td>
<td>Yes</td>
</tr>
<tr>
<td>Kodak M580</td>
<td>Yes, But**</td>
</tr>
<tr>
<td>Nikon S8000</td>
<td>Yes</td>
</tr>
<tr>
<td>Olympus 7040</td>
<td>Yes</td>
</tr>
<tr>
<td>Panasonic DMC-ZS5</td>
<td>Yes</td>
</tr>
<tr>
<td>Pentax H90</td>
<td>Yes</td>
</tr>
<tr>
<td>Samsung HZ35W</td>
<td>Yes</td>
</tr>
</tbody>
</table>

*Does not work very well.
**Auto macro works to 16cm, manual macro to 1cm

Most 2010 cameras do not have “auto macro.” However, all 10 of the cameras we selected, do have it.

In 2009, only 6 of the 10 cameras we selected had “auto macro,” and several of them did not work very well.
## Trends for 2010

### In-Camera Charging

<table>
<thead>
<tr>
<th>Camera Model</th>
<th>In-Camera c USB</th>
<th>In-Camera c AC</th>
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</thead>
<tbody>
<tr>
<td>Canon SD3500</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Casio FH100</td>
<td>No</td>
<td>No</td>
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<tr>
<td>Fuji F80EXR</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Kodak M580</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Nikon S8000</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Olympus 7040</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Panasonic DMC-ZS5</td>
<td>No</td>
<td>No</td>
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<tr>
<td>Pentax H90</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Samsung HZ35W</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Most 2010 cameras do not have “in-camera charging.” However, four of the cameras we selected, do have it.

*No more docking stations or camera cradles, except for Kodak.*
Batteries: Power to the System

- Rechargeable vs Disposable
- Standard vs Proprietary Form Factor (Shape)
- Battery Technology
  - e.g. Alkaline, LiMH, NiCad, NiMH, … 2010 Cameras = All LiMH
- Charger Options
  - Docking Station
  - USB Cable
  - AC Adapter
  - External Charger
- Don’t ignore power consumption

Examples of AA Batteries
Ni-MH Battery Pack, Ni-MH, and Alkaline

Examples of Lithium Ion Batteries for Casio, Kodak and Sony Cameras
Image Review – Methods

- Begin with default setting on all cameras
  - Make sure settings are not terribly different
- Take photographs of the same subjects under the same lighting conditions
- Compare the images side by side
- Rate each image for
  - Color
  - Detail
  - Ratings are made relative to the appearance of the true object (color)

Hint

Once you have a “Gold Standard” or “Reference” camera, you can test new cameras against those images.
Record For Each Test Image ...

- Image Resolution (Megapixels)
- Compression Setting
- Flash Setting
- Flash Fired?
- Flash Level
- Optical Zoom Setting
- Macro Setting
- Background
- Lighting
- Distance to Object
- Object Description
- Subject
- Camera mounting system
Image Quality Review

- It is important to put the cameras into similar modes with similar settings
- This is tedious and imperfect
- What is “Auto?”
Image Quality Review
– Comparable Camera Settings –

Capture Mode (minimal)
- Capture
- Auto setting
- Auto Macro
- Picture size
- Compression
- Image Stabilization
- Auto focus

Auto focus zone
- Exposure metering
- Color mode
- Red eye pre-flash
- Maintain flash settings
- Video out
- Video size
- Video quality
## Comparable Camera Settings

<table>
<thead>
<tr>
<th>Feature Choices</th>
<th>Canon SD3500</th>
<th>Casio FH100</th>
<th>Fuji F80EXR</th>
<th>Kodak M580</th>
<th>Nikon S8000</th>
<th>Olympus 7040</th>
<th>Panasonic DMC-ZS5</th>
<th>Pentax Optio H90</th>
<th>Samsung HZ35W</th>
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<tbody>
<tr>
<td><strong>CAPTURE</strong></td>
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<tr>
<td>Auto Setting</td>
<td>Auto</td>
<td>Box Icon Auto</td>
<td>EXR Auto</td>
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<td>Auto Macro</td>
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<td>Yes</td>
<td>Yes</td>
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<td>In-Focus Indicator</td>
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<td>Red Eye Preflash: On, Off</td>
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<td>Off</td>
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<td><strong>SET UP</strong></td>
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<td><strong>VIDEO</strong></td>
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<td>Video Out: NTSC, PAL</td>
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<td>1280 x 720 &amp; 640 x 480</td>
<td>1280 x 720 &amp; 640 x 480</td>
<td>1280 x 720 &amp; 640 x 480</td>
<td>1280 x 720 &amp; 640 x 480</td>
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</table>
How do we compare images from many different digital cameras?

Analysis Tools

Image Quality Review
Measuring Color and Detail

- Detail of an image is difficult to assess
- Need to compare images side by side
- Need to be able to zoom in
Image Quality Review – Back

Pentax H90

Panasonic DMC-ZS5
Image Quality Review – Ankle

Pentax H90

Panasonic DMC-ZS5

*slight yellow color in area outside of flash zone towards foot
Image Quality Review – Eye

Olympus 7040

Kodak M580
Test Results

Color vs Detail

Color

Detail

GOOD

POOR
Details – But at what expense?

File Size vs Detail

Normalized File Size

Detail

POOR

GOOD
Exercise of Exclusion
– 2010 Cameras –

- Canon PowerShot SD3500 IS
- Casio EXILIM EX–FH100
- Fujifilm FinePix F80EXR
- Kodak EasyShare M580
- Nikon Coolpix S8000
- Olympus Stylus–7040
- Panasonic Lumix DMC–ZS5
- Pentax Optio H90
- Samsung HZ35W
Digital cameras are constantly changing
  ◦ Last year’s winner is sometimes this year’s dud
  ◦ Plan on regular reviews – cameras are frequently discontinued

Technology assessment is a skill
  ◦ Building upon previous experience is useful
  ◦ Keep great records
  ◦ Use consistent tools
  ◦ Share your results and experiences!
For additional information, please visit our website at www.telehealthtac.org or email info@telehealthtac.org.