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The RSS protocol allows, among other uses, for portable media player devices to download files automatically from the internet. Although text RSS feed on portable media devices is currently limited, it is possible that text feeds will become a ubiquitous feature on future PDA/media crossover devices. With the increasing usage of video-enabled portable media players, video content on these devices will also gain strength in the consumer market. Through qualitative interviews this pilot study hopes to investigate usage of new media streams on portable devices, with additional focus on RSS feeds, content categorization and interface category customization. Do users prefer to display their content and RSS feeds by a descriptive category, or by the website from which the feed was retrieved? In this study we hope to gain insight into which style users prefer, if any.

Headings:

    Human-Computer Interaction

    User Interfaces – Evaluation

    User Interface Design – Usability

    Portable Media Devices – Usability

PRESENTING STRUCTURED, RSS-FED NEW MEDIA STREAMS WITHIN A
PORTABLE MEDIA PLAYER: A CATEGORY OR SOURCE
ORGANIZATIONAL DECISION

by
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**<u>Introduction</u>**

In 2005 the podcasting model gained popularity as a method for delivering audio content via the internet. By making audio files available via an RSS feed, users can create their own library of subscriptions to episodic audio programs. The most up-to-date podcasts are retrieved from each of their originating websites with a single click within a podcast-enabled computer application.

Due to the rapidly growing popularity of podcasting, one can now also receive video programs to their pc or portable media device. The newest generation iPods play both video and audio, and display both still pictures and "notepad" text. What this means is that portable *audio* devices are now transitioning to portable *media* devices. The next step could be a sort of hybrid personal digital assistant/media player. One product, PodPlus has taken the first step in this evolution (iPodSoft - making the best, better, 2005). With it, users can retrieve and display RSS feeds of text-based information, such as movie show times and weather forecasts, on their iPod. It is this avenue of podcasting that this study will investigate, from the standpoint of usability and findability. In particular, for RSS text and video feeds, are users more likely to prefer navigating to their target entry if the content is arranged by a descriptive category, or if it is arranged by the originating source? Here are two clarifying examples: Will a user prefer to search for a movie show time by looking for "movies" in the portable media player directory, or will the user instead identify the target information with "Hollywood.com" (the site from which that data podcast was retrieved)? Similarly, when a user wants to watch an episode of the

television program "Lost" on her iPod, does she first think of as being classified by source (ABC – the network from which the show originated), or by a category ("Television" or "Drama")?

**<u>Purpose</u>**

The purpose of this study is, through user interviews, to ascertain whether or not there is a preference between accessing RSS content on a portable media device based on category or source. This information will assist device usability professionals in anticipating user needs when maneuvering through these and similar interface hierarchies. It will also establish additional data to suggest the ways in which people store and retrieve groupings of information within their minds. That is, when we have an information need, do we "see" the path to a solution in our mind's eye going to a "category" bin, or to the proper "source" for an answer.

**<u>Literature Review</u>**

Beyond the individual differences and preferences of people, the question posed for this study contains three main components: the portable media device, a possible RSS media feed, and the category/source organizational choice.

A basic characteristic of the portable media device is its small screen. Even a device as large as the Playstation Portable has only a 4.3" wide display (Press release, 2004). Much of the literature written about small screen displays is concerned with screen size and typographic features. This makes sense, as the smaller number of characters that can be displayed on a PDA, cellular phone or portable media device is a defining quality not

shared by standard computer monitors. The computer display not only has a larger amount of screen "real estate" but also the ability to change resolution, thus granting the user better control over his or her viewing and navigation experience.

Studies, such as the one done by Trevor, Hilbert, Schilit & Koh (2001) on the best way to move information from the internet to a portable device, focus on the difficulties in taking a web page and making the content fit legibly onto a small screen. Software and hardware developers assume that a user will want the full web experience in a smaller form, and strive to replicate a web page layout in the limited display conditions.

But what if the physical layout is not the sole issue? What is the best way to focus on the content architecture, rather than the visual design or size issues of the information being displayed on a small screen device? How do people cognitively represent the content when they have an information seeking need? Do they have a mental construct of the content as a collection of information *about a topic*, or an item from a collection of a *known source*? Or perhaps people do not actively conceptualize their information needs in terms of category or source – instead considering each video, song or text entry as a unique, non-categorized entity. Here the academic literature grows sparse and contradictory.

**Screen Size and Page Length**

The research in how we are affected by the number of characters per line and per visible page on an electronic display is "relatively immature" (Dyson, 2004). Dyson herself, however, does have several studies and analyses on this topic. In her work with Haselgrove, the authors examined how reading speed and line length affect a user's comprehension of the text. This study utilized 36 subjects, who were exposed to text

passages with both varying line lengths and scrolling speeds, then quizzed on the information within the passages (Dyson & Haselgrove, 2001). The results are not surprising: by pushing a person to read beyond their normal speed, the amount of material covered increases, while comprehension decreases. Similarly, a medium-length line is most conducive to comprehension, as it requires the least amount of extraneous eye movement and spatial processing (Dyson & Haselgrove, 2001).

Similarly, the study by Chae and Kim (2004) focused on screen size and depth (that is, how many levels down an item is located from the root). Their results are more specific than the Dyson study, stating that it is the complexity of the task which affects the impact of screen size and depth – the more complex the task, the easier it is to complete with a larger display (Chae & Kim 2004).

Albers and Kim conducted another study in pursuit of a connection between screen size, search time and information retention. Of importance to the current study are the findings that, while people take more time in gleaning the same information from a small screen interface over a large one, error rate does not directly correlate to screen size. Also significant is the frustration that subjects expressed in working with the smaller screen (Albers, 2001). In contrast to the Chae and Kim findings, this study found that "error rate did not reflect difficulty" (2001). This might be explained by the previously noted additional time spent on the small screen tasks. So while people are willing to slow down in order to use a smaller screen, it appears that they still are concerned with efficiency.

From these studies we can see that, in some cases, the amount of viewable text on the screen *does* matter – whether by forcing the user to slow down his or her reading speed, by causing errors in information retention, or though general frustration. Though the

current literature focuses more on large chunks of text, the effect of screen size and line length cannot be discounted in the current study. If we are to believe both the Chae and Albers studies, whichever method of RSS content architecture has fewer characters per line should affect efficiency but not error rate (as browsing to a file does not require high data retention) (Albers et al., 2001, Chae et al., 2004). Is this truly the case? If so, will it cause results favoring one method or the other to be falsely attributed to the categorization method?

**Web Layout and Page Conversion**

The literature has some content regarding the conversion of web page layout to small screen displays. The M-Links system, tested by Hilbert et al, strives to develop a better way to capture the text and links within a web page, and move these to a format more easily displayed on cell phones (Hilbert et. al, 2001, p. 123). Their *modal* interface, named so due to its ability to separate the text-reading and link-browsing modes, is an interesting method of giving the user the appropriate sets of data in a format that is useful on a small screen.

While the present study involves media players and not web-enabled devices, there are surface similarities between this and the M-Links study. The RSS protocol is concerned with delivering the raw content and any XML metadata. This is why RSS is perfect for putting information onto portable devices, where layout conversion is almost always an issue. RSS can deliver not only the video file itself, but also metadata such as whether the video is a TV show or a podcast, the source website, genre and so on. The metadata can be delivered separate of HTML structure. The M-Links system also handles XML data. Additionally, both systems create a menu tree for links to other sections.

The ability to use the M-Links early study data in relation to the RSS-based system is a useful proof-of-concept in demonstrating that a small screen device can display text data from the web in a readable format. However, the two modes, text reading and website browsing, do not directly map to the different cognitive classification methods able to be embedded in the RSS. The modal system is concerned primarily with automatically parsing a standard HTML page into its text and link components, rather than the semantic and categorical qualities of the content itself.

Subject testing by Lee and Grice (2003) on their own system for converting HTML pages to XML shows both promise and gaps in understanding categorization architecture on small screen devices. In this study, XML was used to create adaptive content, allowing the user to control how text and images are viewed on a small screen. Subjects could control whether sounds, abstracts or images were displayed, as well as image size (from icon to thumbnail). "Overall, the users were satisfied with the application's ability to overcome the constraints of small devices" (Lee & Grice, 2003). Once again, however, we are dealing with structural choices. There is no mention of how the user approaches the content from a categorical perspective. This trend is evident in much of the literature, focusing on the technical "how" of presenting data on the small screen, without looking too closely at the "what" format of content the user would like to see.

**User Performance versus User Preference**

Pulling back to the wider view of the subject, there is the question of what impact the choice of descriptive category versus originating source will have on the user performance with the portable media device. Does the choice matter?

Nielsen and Levy (1994) conducted a study of *other* interface comparison studies –

what they termed a "metaanalysis". By comparing a large amount of study data, the

authors were able to make more reliable assumptions about how user preference and

performance are related. They found, again unsurprisingly, that "there is a positive

association between the users' performance and their subjectively expressed preferences"

(Nielsen & Levy, 1994). In fact, users tend to stick with systems that they like, even

when that method is less efficient (Nielsen & Levy, 1994). This is important supportive

evidence in the need to ascertain user preference in his or her navigation style. According

to Nielsen and Levy, personal preference will make a difference to the user (even if it

may or may not affect task efficiency).

There is another passage in the same piece that is an incentive toward conducting

further research in the present study:

> "….A few studies made two or more interaction techniques available to users and
> assessed user preference by the proportion of time they used one technique over the
> others. Even though users are expressing their ultimate preference when they choose one
> interface over another for a particular interaction, these studies were not included in the
> present metaanalysis. Users presumably chose an interaction technique based on pertinent
> characteristics of the particular task at hand (even though they may not always choose
> optimally [16]), creating a possible confounding effect for measures of performance and
> preference in studies with this design." (Nielsen & Levy, 1994)

By excluding those studies where two or more interaction techniques were available,

the conclusions about preferences are slightly weakened. Further, the statement "[u]sers

presumably chose an interaction technique based on pertinent characteristics of the

particular task at hand (even though they may not always choose optimally [16])," is

somewhat contradictory (Nielsen & Levy, 1994). Are the users choosing based on the

best technique for that task, or are they basing their decision on an emotional connection

to one interaction technique? The answers to this duality may lie in the current study: By

forcing the participant to become aware of his or her own cognitive navigation and classification style for media streams, we may discover more about how users in general approach content navigation on a small screen media player.

**Cognitive Representation of Information**

In a study conducted in 2004, Ravasio et al. examined user practices and experiences with the modern computer desktop. Their larger goal was to discover the ways in which usability might be improved for the desktop environment. One of their post-study suggestions was to create a storage facility (i.e. information archive) which "represents the user's view of information; replacing pure technical file metadata with more user-friendly attributes; and introduction of annotations as a new information type" (Ravasio, 2004). This directive applies to the necessity of the current study, to find out in concrete terms what a "user's view of information" actually is.

Further in the study, Ravasio and her colleagues defined at least three angles in which stored information may be conceptualized and processed in a given situation:

> 1) *Task oriented* – focused on the task to be accomplished
> 2) *Context oriented* – focused on other documents, programs and tasks at hand concurrently.
> 3) *Content oriented* – focused on the actual information encapsulated in a specific document" (2004, pg. 174).

These three views may be applied to the category versus source question, with numbers 1 and 3 taking the role of category ("What *type* of task do I want to accomplish? Find movie show time information") and number 2 representing source ("Who would have movie show times? Hollywood.com would have that").

A *British Medical Journal* study asked a subset of their subjects from a health information retrieval study about the information source and category of their searches.

Only 20.9% of the subjects could identify the information source, and only 23.2% could identify "to which broad category the site owner belonged to (for example, government agency, public institution, university, commercial organization, private person, self help group)" (Eysenbach et al., 2002).

So which is it? Do users have the need to understand text information by its source, category and context, or do they pay such things little mind?

According to Lansdale, "[q]uite simply, information does not fall happily into neat categorization structures which can then be implemented on a system by using simple labels" (1988). A study by Quan, Bakshi, Huynh & Karger in 2003 gave participants the ability to classify a document by multiple categories using Internet Explorer. In 2006 a similar method is more commonly known as "tagging" and is a common feature on websites such as del.icio.us and flickr. The assertion of the study was that "multiple categorization not only improves organization and retrieval times but also matches more closely with the way users naturally think about organizing their information." (Quan et al., 2003) Users then were questioned about the "multiple categorization" method of organizing data, versus a more traditional folder hierarchy system. Their results were "8 of the 21 users felt that multiple categorization by itself more closely matched the way they think about information, and an additional 11 felt that some combination of the ideas embodied in the folder and multiple categorization paradigms captured how they modeled information." (Quan et al., 2003) The finding that 90 percent of the users surveyed mentally classify information items by more than one categorization system (to varying extents) is another clue that an interface could benefit in supporting multiple categorization and navigation methods.

**Usability and the Portable Media Player**

According to The Register website, by the end of 2005 Apple Computers will have sold more than 35 million iPods since the debut of the device in November, 2001 (Smith, 2005). With this rapid rate of sales for a fairly expensive and technical device, one would think that the Usability community would focus their attention on the iPod – what makes it so appealing, and what can be done to improve it. This is especially true considering the use of the scrollwheel navigation interface. While not a new input method, it is not one found on cellular telephones, personal digital assistants, or other similar handheld devices.

As of early 2006, a search of Google Scholar for "iPod usability" revealed several articles on how iPods are a sign of "the usability era", mention of using the devices in Vehicle User Interfaces, and discussion of "conversion appliances" (2004). Usability studies that specifically involve the iPod, however, are nearly non-existent in the academic literature.

The reason for the current lack of literature on iPod usability may be simple: it takes time for a new trend in any field to be noticed, analyzed, understood and discussed. In a year there might be a flood of research on what makes the iPod popular, and how (or whether) to improve on its design. For now, however, the field is open. This study will examine one aspect of the iPod – and by extension other similar portable devices – in order to begin filling in the current gap in the Usability and Information Architecture literature on the subject.

**<u>Study Importance</u>**

 This question is important to ask from a user interface and information architecture standpoint. It is through such testing and refinement that the user experience is improved. By knowing beforehand what method is preferred more, that browsing structure might be implemented by default within the device. Note that this does not preclude later interface customization on the user's part – the ability to change the RSS feed display from content to source or vice versa. It only provides the guidance to establish a default setting for a "just out of the box" portable media player.

 The primary benefit of this study is in delivering a default method of browsing information with which users are more naturally inclined. Maneuvering through the directory layers of an iPod (used henceforth to represent any similar portable media player) should be a very smooth, quick operation. While reading text on the iPod can be more attention-intensive than queuing up an album to play, it is not unreasonable to expect users to be walking or (unfortunately) driving while manipulating the device. Therefore it is both a matter of efficiency and user safety to provide an interface that gets to the target data with as little cognitive load as possible.

 The information gathered from the study will also benefit the corporate sector, as it supplies formal data to back up design decisions where both source or category are viable choices. Further, any additional studies in the fields of user interface, information architecture or retrieval will be able to build upon the evidence presented here. If a preferred method is discovered, then further research into whether this preference holds true across all demographics could be pursued.

Lastly, the question of how users prefer to physically navigate to their intended information also may speak to how people cognitively navigate the same paths. The work of Arrington and Logan (2004) analyzed the efficiency of visual cues and task switching. Having more data regarding these choice-making strategies and preferences may contribute to the research in fields such as cognitive science.

## **Methodology**

### **Recruitment**

Emails were distributed to two departmental listserv at the University of North Carolina, Chapel Hill – Library/Information Science and Journalism. The study was not limited to UNC students and faculty, as anyone over 18 years of age within the Raleigh-Durham-Chapel Hill Triangle could potentially participate. After two weeks, a duplicate email was sent. Flyers were posted in and around campus. Both flyer and email briefly described the study and asked interested parties to complete a short web survey. Requirements for inclusion comprised owning or regularly using an iPod, as well as using it for more than just listening to music.

The initial plan for the pilot study was to complete ten interviews. Due to narrow inclusion criteria, possibly low compensation amount ($10) and a narrow time frame for data collection, only five participants completed both the web survey and personal interview. An additional twenty people took the web survey but did not qualify, or did not respond to the invitation for the interview portion.

**Procedures**

The web-based survey was 5 questions (see Appendix B), two of which were "trigger" questions that decided whether a subject could move to the interview portion. These were:

- "Do you use your iPod for watching video programs?"
- "Do you use your iPod for text-based information, such as calendar, news headlines, movie showtimes or weather forecasts?"

Those who responded "yes" to one or both of these received an email invitation to participate in a 30-60 minute interview with the primary investigator. This interview took place on the UNC Chapel Hill campus. The participant received $10 for time and trouble, and was free to stop the interview at any time. No written consent was required, in case the interview subject wished to describe media on his or her iPod from a source or via a method that might be illegal under current copyright legislation.

Before the interview began the primary investigator received verbal consent from the participant to audio record the proceedings. After each interview was complete, the audio recording was transcribed and the original mp3 file deleted.

The investigator also explained that, although there were several pre-written questions, the participant should feel free to expound on any interesting points raised during the conversation. This helped encourage more of a "dialog" atmosphere, rather than a straight question-and-answer.

From here the participant's answers and comments determined the flow of the interview. Sessions ranged from as short as five minutes to over thirty. Questions focused primarily on four general topics (the complete list of main questions may be found in Appendix C):

- How the participant used text and/or video on the iPod

- What programs he or she used to acquire these media streams
- How the participant cognitively viewed the media collections on the iPod. (This question required a bit of introductory explanation by the investigator)
- Whether the participant customized his or her computer programs (e.g. adding or removing menu buttons, changing the default view). Also, whether he or she would customize the iPod menus, if the option were presented.

The PDA question would then lead to a probe regarding carrying two devices that contain some cross-functionality. This, in turn, led to discussion regarding the integration of PDA functionality (calendar, notes, simple games) into the iPod.

The DVR question addressed the category/source aspect, with probes into whether the participant used the category and keyword search functions built in to most DVR devices.

## Findings

### Participants and Usage

As mentioned previously, out of the target number of ten, five participants completed both the web survey and interview portions of the study. This was disappointing, and may point to a currently limited utilization of the iPod for video and text functions. Future studies will almost certainly find more users with video on their iPods, as evident in the growing number of video podcasts, TV shows, music videos and even a direct-download full motion picture available on the iTunes music store (Apple-iTunes-Overview, 2006). The future of text on the iPod may depend on the merging of portable media devices with personal digital assistants. This merging will be discussed in a later section.

Here is a breakdown of the participants and their primary usage habits (note that names are fictitious):

"Amy" –Graduate Student. Uses the iPod video functionality for school-related projects only.

"Dave" – Teacher. Uses the iPod mainly as a portable storage device for non-music files. Has synchronized the iPod to the calendar, but did not utilize this functionality. Rarely listens to music.

"Stan" – Professional. Uses the iPod for both music and video. Regularly watches one TV program, *Lost*, downloaded from iTunes, and one video podcast series on his iPod. Has downloaded and utilized text/calendar data on his iPod, but not on a regular basis.

"Jim" – Teacher. Uses the iPod as a portable file storage device. Has a modest mp3 collection (around 6 gigabytes) and on rare occasions listens to NPR podcasts.

"Ted" – Graduate Student/Teacher. Uses the iPod for both music and video. Watches one iTunes-downloaded TV program, *Battlestar Galactica*, either on his iPod or his laptop.

The number of participants who viewed the major purpose of their iPods as file storage devices was most surprising. Although this is not a new capability for the iPod, it is not the usage Apple likes to project for its product. There is no menu choice to enable "disk mode" in the iPod menu – the button combinations for this function are discussed

in the manual (iPod features guide, 2006). This design decision by Apple illustrates a subordinate view of the iPod as portable storage, versus a primary role as a portable media player.

Only one of the five participants was female. Currently there is no academic data showing gender percentages among portable media device owners. However, a survey in December 2005 by Podtrac (a marketing firm for advertising in podcasting) found that "78 percent of those who have ever listened to a podcast are male" (Skillings, 2005). Further, a 2002 study conducted at the University of Rhode Island regarding interactive television devices showed "greater intentions [for men] to purchase the new interactive device and to pay a higher price for it" (Dholakia & Dholakia). With the video iPod still costing around $300, this early hardware adoption by males might explain the skew in the participant gender of the current study.

The other trend among the participants was a high level of education. There were no participants at the undergraduate level or below (although some of the paper study fliers were displayed in venues where undergrads or non-students/teachers would see them). Would undergraduates, potentially younger and with more free time, have more varied usage habits with their iPods? Additional testing among a wider range of backgrounds and with more participants could add both breadth and depth to the existing data.

**Categorization**

Most important to the category versus subject question is this finding: none of the participants admitted conceptualizing their media content solely by its source. One person dual-classified her view:

*Investigator*: That is, do you think of it by topic or by where it came from—what site or what program?
*Amy*: Um, little of both, I think. But topic is more important, I think.

In fact, most of the interview participants described their media files in multiple ways at different points during the conversation. This multiple representation reinforces Lansdale's suggestion that people do not categorize information neatly (1988). Among the various methods used by the participant to portray his or her media on the iPod were:

Content:

*Jim*: I think I tend to be more focused on what it is.

*Investigator*: Okay, so you tend to be more specific about the program itself and not think of it either in broad categories or broad origin?
*Jim*: Yes.
---
"I'd organize them by their content, and then, the computer will figure it out." – Dave (referring to digital images)

These three quotes are interesting in that, while each may be considered classification by "content", Jim's seems to have a very atomic view of his media items. This "every item is unique" view of media objects makes creating a navigation system tricky. All items are unique, so there is no grouping scheme that can be employed. For a user like Jim, a search function might be a navigation method more useful for his needs. He could put all files into a flat organization and then search for the media object or objects via keywords.

Dave, like many users, relies on his computer to make the correct decisions regarding how to classify and arrange files on his iPod. In this situation he may be adapting his cognitive style to match that of the interface, rather than finding a way for the interface to work *with* his mental organizational model.

Artist/Title:

> *Investigator*: ….do you organize the shows in your mind by their type—TV programs, webcasts—or maybe by content like "this is Lost" and "this is the sneakers program" or some other kind of organization?.
> *Stan*: "Um, it's probably by, you know, artist or title, and I would go to the top-level directory for, um. Cause I have all my podcasts just in the podcasts directory and I usually only [have] one or two on there at a time [….] I definitely think of it under the main title of, you know, what it was."

Stan appears to have multiple concurrent organizational models for his iPod content. When it comes to video on the iPod, he thinks of the media item by its title. This is probably a very low cognitive load system when his collection consists of a narrow range of content (one television series and one podcast subscription). If Stan were to begin subscribing to several podcasts and purchase a bevy of TV programs, it might become helpful to sort the items into more broad categories. In fact, while he admits distrusting "genre" metadata tags for music – as he feels some music defies being placed in just one genre – Stan does not have as great a problem with assigning categories to video content.

Context:

> "Well, it depends, I guess, on the context from which one is doing the thinking. If I'm thinking of them as computer files, uh, I think of them as little electronically activated zeroes and ones in very long series on the hard drive of my computer [....] if I'm editing an image, then I think of it as, um, a jpg file or a gif or a tiff or a web archive file and I don't really envision it. I guess I probably envision it as what it looks like on the screen. I think of it that way—I guess I see it sort of like a text or like a photograph, because that's what I see." – Dave

In this cognitive organization, a media item on the iPod may be thought of by the context between the user and the item. When asked if he thought to classify the digital picture files on his iPod by their source (i.e. the camera), Dave replied that he did not. As seen in the quote, he *does* classify the pictures differently, depending on how they are being stored or used.

Perhaps the file takes on its context only after leaving the source – be it a digital

camera for images or iTunes for video. The user action of transferring the file makes it

"real". From this point the conceptualization of the file in the navigation scheme depends

on the context. If Dave is thinking of the images as computer files, an icon or list view

should be displayed, since he does not need to see the visual content of each picture. If he

is browsing the images as photographs on the iPod screen, then displaying the same icon

with the file name below would be inappropriate for the situation. Portable media

interface designers must be ready for the challenge of media items with multiple visual

and mental visualizations, depending on the context of the user.

Category:

> "….when you get into video and stuff, it makes sense to maybe have television show, video podcast for genre, but it doesn't sync up with the rest of how my iTunes is organized." – Stan
> ---
> "If my memory serves me correctly, the default has, like, movies, video podcasts, and TV shows as separate categories and that's the way I would conceptualize it." – Ted
>
> "So, say, if I did another sci-fi series, like the new Dr. Who is coming out and maybe I want to watch that. They would all go under sci-fi under TV Shows for me, but not under Sci-Fi Channel. I wouldn't think of it that way." – Ted
> ---
> "So I would probably want to add and subtract, well you can activate and dis-activate some of the features in there, but I would probably want to add some categories of my own, but I would want to use it for a while, I'd need to use it for a while before I feel that I know what's necessary to add. I mean, I'm not yet using it to its full capacity." – Dave

The term "category" in the original question of "source versus question" appears to

have been clear enough to the participants, as none of them picked "source" as the

primary mental model for content classification. In retrospect, however, the definition of

"category" is less than precise. Does this include "genre" but not "media classification"?

The participants described both when referring to category. Ted considers "movies, video

podcast and TV shows" a category classification; but he later creates the sub-

classification "sci-fi under TV shows". In the former case he is referring to a conceived transmission method (television versus podcast), while in the latter he is discussing a style genre.

The original research question may not have clearly defined the term "category" adequately, and that imprecision carried into the interview questions. On the other hand, this confusion illustrates the difficulty in creating a unified navigation system that is intuitive to a majority of users. When the users themselves have multiple representations of their content, a designer must either provide customizable or context-sensitive navigation, or pick the most ubiquitous categories and hope that it pleases the customers.

From the participants' comments, Apple does seem to be choosing wisely for their menu systems. Ted demonstrates that he can verbally recall the top level of the video menu on his iPod. Stan mentions some of the same items (television show, video podcast). Again one can ask if Apple has named and organized the iPod menu items so perfectly as to be intuitive and memorable, or if iPod users have simply memorized the choices.

**Customization**

Questions during the interview about customization were generally presented in a two-step process. First the participants were asked if they customized programs on their personal computer (that is, changed options such as menus, toolbar buttons and other user interface items). This was a lead-in question to asking, if given the opportunity, would the participant customize the menu categories on the iPod. The query was aimed at finding out whether the current navigation categories suit the cognitive schema of the person using the device.

All five participants agreed that they customize programs on their personal computers. The most often mentioned customization was changing options on Microsoft Word. This indicates a user group who is not afraid to alter his or her electronic working environment in order to achieve greater efficiency and/or usability. When asked if the participant would customize the menu and category system on the iPod, responses were varied and generally negative. Jim was most resistant to the idea of customizing the iPod:

> "The iPod's strength is its simplicity, and elegant user interface. When you start trying to add additional functionality for use use-cases that are going to address the needs of a small part of the population, you are going to begin to erode away at what's made it what it is, so while, I might want certain other things and you might another set of things, then we might have to put two buttons on that iPod and that would not be a good thing because it would make it more complex."- Jim
>
> So, customization is something that is overrated. If the design is good and meets the needs of 90-95% of your target user community." – Jim

His argument against changing an interface that is lauded for its simplicity has strong merit, and is echoed by Dave's comments:

> "I'm really amazed by, and I guess everyone is amazed at that, by how efficient and quick the clickwheel, um, mechanically is as a way to find your way around among hierarchies of subordinate files"

Interestingly, both Dave and Jim later admitted that they would "tweak" the interface, if that option were available (albeit only after spending some time with the device). These small admissions were certainly not an outcry for a more usable system on the iPod.

Stan made it known that he would prefer *less* metadata on his media files:

> "I definitely would leave them alone. I actually prefer to strip out a lot of the extraneous information from iTunes from music and video and stuff."

While Ted gave these reasons for not wanting to customize the iPod:

> "I'm afraid to tinker with it lest I let it do something I don't want it to do. But it seems intuitive to me. It's not a problem. I wouldn't really have set it up differently that I can think of."

These opinions point to physical and navigational interfaces that are intuitive and usable by a majority of the target audience. They also point to a user base that prefers simplicity over "explorability". The latter term refers to of ease of and encouragement for a user to take personal initiative in discovering all of the functions a device has to offer. Two participants mentioned that they had not yet explored all of the functionality of their iPods, despite regularly having used the devices for at least three months. Of course, most people do not use all of the functionality of their technology devices. A study in 2000 found that users of MS Word utilized only 12 of the 265 first level functions within the application (Baecker et al.).

There are those out there who are pushing the iPod to its fullest usage and beyond. The audio podcast was not an option on the earlier iPod or iTunes menus until computer programs like iPodderX began to offer capabilities that iTunes did not have. In this way, innovators and early adopters pushed Apple to update their interface.

So how should a user interface designer balance this conflict between a stable interface that most people seem to embrace, and new features which expand the utility of the product? If the participants in the current study are an indicator, the answer for Apple should be "slowly". The current menu naming scheme appears to work well for the average iPod user, and there is little enthusiasm for customization or alternate navigation systems. Organizing by descriptive categories such as Music, Video, Podcasts and Television Show seems to map well to the cognitive view of the user's media collection. When the user thinks about a particular media stream beyond its title (either the title of the item itself or a larger category such as series or album), little thought is given to the internet source of the information. Focus is on the content itself, with classification of

media subtype and genre as possible simultaneous or subordinate systems. Whether this disregard of the source would hold true to text-only streams – such as news headlines or sports scores – cannot be ascertained from the current data due to the lack of users in the study with regular RSS text feeds on his or her iPod. Future full-scale studies should focus on recruiting a larger spectrum of iPod owners.

**The Future: The iPod as Portable Digital Assistant?**

During the interviews, participants were asked if they used a Personal Digital Assistant on a regular basis. Later the question arose of what changes a participant would make to the iPod. With the PDA question still fresh in their minds, it's not surprising that two participants gave these responses:

> "It's been nice, but, maybe to have a crossover with kind of a Palm device where you had a little bit more organization, you have more options for what kind of software you want to load on there, keep spreadsheets and keep, you know, Word documents and stuff like that" – Stan
> ---
> "Well, I mean, you know it would be great if you could use it as a web browser and that sort of stuff, eventually. [….] Of course, it doesn't have—the interface isn't real good for typing in things, so they would have to modify that somehow. But, yeah, I wouldn't actually mind those PDA functions on the iPod since it's already a device I own." – Ted

As software developers modify and supplement the iPod software to allow new functions, the device continues to move away from being a simple portable jukebox and blurs into the realm currently occupied by the Personal Data Assistant. Programs like PodPlus for RSS news and weather or Wikipodia for uploading the entire text of the Wikipedia project are at the crest of this new functionality wave.

The user interface transition from iPod music device to iPod PDA, if it occurs, will not be without obstacles. Ted astutely points out that the scrollwheel is not the best physical entry method for text. Scrolling through letters and numbers one at a time will be slow and frustrating.

Microsoft is making an attempt to deliver this crossover device with its "Ultra-Mobile PC" (UMPC) platform. Also known as Origami, the hardware for the UMPC is roughly the size of a paperback novel. Its 7" screen is large enough to allow touch screen controls. For text input, the touch screen displays two quarter-circle keypads (see Figure 1) which can be operated via the user's thumbs.
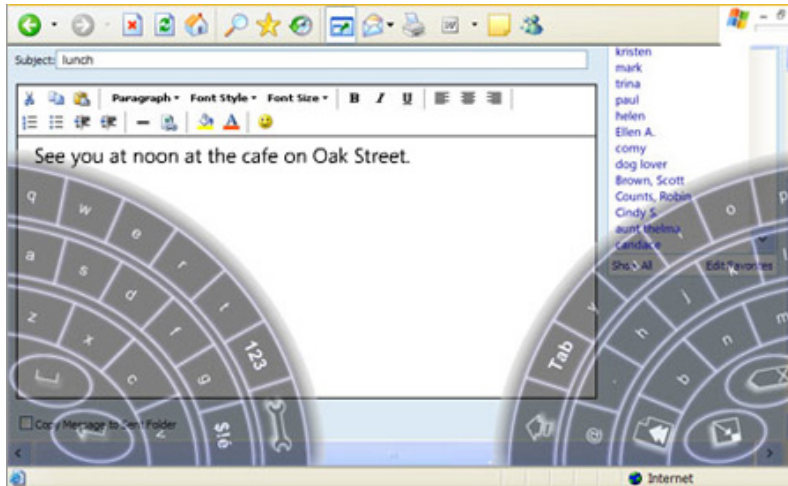


**Figure 1 (from http://www.newsmobile.it/notizia/06,03,13,5689595-1.htm)**

Technology journalists have been less than enthusiastic about the UMPC. Due to a marketing campaign by Microsoft before the system was launched, the news media expected this device to provide strong competition to the iPod. With boasts of one portable system that could play music, movies and games, as well as be internet enabled and be an on-the-go personal computer, it was understandable why the expectations were high.

Once the hardware was shown to the public, however, the critics were not kind. "They do not get it," said Molly Wood of CNet's "Buzz Out Loud" tech news podcast. "It's a product in search of a market" (quoting Baker) (Merritt & Wood 2006). They bemoaned the short battery life, "large" size and high price of the first UMPC products. Most

relevant to the iPod is the complaint that Origami/UMPC is a product "that no one has been begging for" (Merritt & Wood 2006).

Still, the next generations of UPMC may be lighter, cheaper and more appealing (just as the Apple Newton was a maligned precursor to the more successful PDA). Apple must now design future products for both people like Ted and Stan, who want some PDA functionality in their iPods, and *also* like Amy, Jim and Dave, who are unconcerned or resistant to changing what they feel to be an overall good device. With each new option added – be it user-configurable menus, a touch screen instead of the scrollwheel, or built-in RSS-text feed capabilities – Apple risks alienating existing customers. If the company keeps its features and interface static, it will eventually fall behind the competition. On the other hand, the criticisms launched against the UMPC demonstrate that the general public may have not yet reached that "critical mass" in demanding a hybrid PDA/portable media device product.

## Conclusions

The participants interviewed during this pilot study gave little thought to the website or source of the media streams on their iPods. The cognitive identification of the media as having a single, quantifiable "category" was inconclusive – with participants giving multiple classifications such as title, artist/creator and media type (TV show, podcast, etc.) for the same media stream. It is this multiple categorization aspect that is most promising for future research, as well as the most frustrating for interface designers. Simplicity and usability seem to take precedence over functionality and customizable interfaces on the portable media device. Yet it can be difficult to create one interface for a

series of items cognitively viewed in multiple ways. The iPod team is doing well with their design choices in this area thus far. Two additional studies should be conducted to understand the high satisfaction rate with the iPod interface: First, a wider variety and more numerous subjects should be questioned about their satisfaction with the iPod interface. Would the same results arise among more diverse users? Second, the independent variable of the iPod itself should be tested. Do users of other portable media devices, such as the Creative Zen, feel a greater or lesser amount of satisfaction with their players? From these results the Human Computer Interaction community might begin to sort out not only the simultaneous multiple cognitive models of media by the user, but also the physical interface elements that best complement these representations.

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## Appendix A: Glossary of Useful Terms

Category: Very short descriptor of the subject matter which is contained at lower connecting levels of the information hierarchy. An example would be the category "Weather", which would then lead to sub-items such as "Current Conditions", "24-hour Forecast" and "Seven Day Outlook".

Display: The size and, ergo, number of characters that can be shown on a digital screen at one time.

Findability: How easy it is to reach the desired target within a record or collection of records.

Information Hierarchy: The parent-child root structure for organizing file containers, sub-containers and data files.

Podcasting: a way of publishing audio programs via the Internet, allowing users to subscribe to a feed of new files (usually MP3 audio files). (Podcasting, 2005)

Portable Media Device: Any electronics component designed solely to play audio or video files and be easily portable by the user. Although text can and is stored and displayed on a portable media device, this study focuses on devices whose primary user

function is to play audio and/or video content, so as to distinguish these devices from a laptop computer.

RSS: acronym of *R*eally *S*imple *S*yndication. It is a family of XML file formats for web syndication used by (amongst other things) news websites and blogs/weblogs. (RSS (fileformat), 2005) RSS is also the most common way to allow users to subscribe to podcasts

Source: The common or commercial name of the web page from which the RSS podcasting feed originated. The "http://www" will not be included in the source display, nor will the top level domain (e.g. "http://www.unc.edu" will be displayed as "calendar.unc")

Usability: How comfortable a user finds an interface and its information structure.

**Appendix B: Web Survey Questions**

1) Do you use your iPod for watching video programs?

- Yes

- No

2) If yes, how do you acquire your video programs for use on your iPod? Check all that

apply

- Purchase via the iTunes store

- Download the video program automatically from the internet using a RSS feed (aka

  "podcast" or "vidcast") Note: This would include the video via the podcast feature on

  iTunes

- Download the video program from the internet without using an RSS feed and not

  through iTunes

- Convert the video program from a dvd or recorded television broadcast

- Acquire my video programming from some other source

- Not sure which method is used

3) Do you use your iPod for text-based information, such as calendar, news headlines,

movie showtimes or weather forecasts?

- Yes

- No

4) If yes, how do you acquire your text data for use on your iPod?

- Synchronize with text data only stored on your computer (i.e. not from the internet)

- Download text data automatically from the internet using an RSS feed

- Acquire the text data from some other source

- Not sure which method is used


5) Do you use an alternate operating system (i.e. not the OS that came pre-loaded) on

your iPod, such as Linux?

- Yes

- No

## Appendix C: Interview Main Questions

[If the subject answered "yes" to using their iPod for video on the web survey]

You mentioned in the web survey that you use your iPod to watch video. Describe to me the types of videos you watch on your iPod.

[If the subject answered iTunes store]

When you purchase videos from the iTunes music store, do you use the search box to find the title, or browse the selections?

Search: What kind of words do you use in your search?

Browse: Please walk me through an average visit to the iTunes store to purchase a video. How do you go about finding the title you want to download?

When you think of the video content on your iPod, how do you picture it being organized in your mind? [If clarification is necessary] Do you organize the shows in your mind by their type – TV program, webcast, movie, by genre, by where you got the content, or some other type of classification?

Would you want your iPod to match this classification system?

How do you feel about the way the iPod classifies any kind of media? Does their system work for you?

If you had the ability to define your own categories for your video content, would

you customize the menus, or would you stick with the default menu structure?

Do you use a Digital Video Recording device, such as a TiVo, in your home?

[If yes] Do you use the category filter, such as Sports or Movies, to see a

subsection of what is available on the schedule?

Do you designate some channels as "favorites", allowing you to jump

between your favorite channels without having to go through the

intervening channels?

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[If the subject answered "yes" to using their iPod for text data functions]

You mentioned in the web survey that you use your iPod for text data. Can you describe

what those uses are?

[If the subject receives text data via RSS]

What program do you use to retrieve and transfer the RSS text feeds to your iPod?

When you think of the text content on your iPod, how do you picture it being

organized in your mind? [If clarification is necessary] Do you think of the text by

its topic, by the site you retrieved it from, or some other way? [Example] For

example, if you received news feed from the BBC, would you think to look for a

menu choice that said "News" or one that said "BBC" on your iPod menu?

If you had the ability to define your own categories for your text feeds – would

you customize the menus, or would you stick with the default menu structure?

Do you regularly use a PDA or other portable electronic data organizer, other than your

iPod?

When available, do you customize a program on your computer to fit your needs, or do

you use the default set-up?

---

Are there features you wish the iPod could do now that it doesn't, or not?

[If yes] What features are those, and why?

Have you ever tried to teach anyone else to use your iPod?

[If yes] Did you find it easy to teach them to navigate through the menus and to

find all of the iPod's features?

[If no] What problems did you encounter when trying to teach another

person to use the iPod?