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Technology fluidity and on-demand webcasting adoption

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Abstract

The Internet, a truly "on-demand" medium and not bound by geographic location, is a natural sphere for local broadcasters to obtain further branding advantages and additional advertising revenues by providing entertainment, infotainment and shopping services. This scenario could become a reality, provided that the broadband technology allowing for instant and smooth streaming video broadcasting over the Internet is made economically and technically viable for most Internet users. For those individuals who value the "anytime anywhere" on-demand viewing experience, watching webcasts with the use of a PC or a mobile hand-held device (e.g., a video I-pod) is a rapidly emerging trend.

This study proposes to assess the market potential for webcast program offerings as an ancillary interactive service from a local broadcaster. In particular, it evaluates audience interest in adopting webcasting services as a fluid Internet communication technology and the potential factors determining such audience interest. Findings suggest that the Internet users who are most interested in adopting webcast viewing also have the tendencies to: (1) capitalize on the fluid nature of the Internet, (2) seek to satisfy their affective gratification expectations, (3) substitute radio listening with online-radio access, and (4) stay online for a longer duration of time each visit.
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1. Introduction

As the pace of technological convergence hastens at the dawning of the 21st century, the American telecommunications industry – including the electronic entertainment media – appears to be at the most important crossroads it has yet seen. While uncertainties about the future video marketplace abound, few broadcasters have seriously contemplated how to position themselves in this new digital media environment, aside from their forced compliance with the federally mandated digital broadcast readiness.

To "catch up" with the fast changing entertainment and information marketplace, however, broadcasters are starting to adapt to the Internet environment by establishing and promoting their station web sites. While an NAB study found that at least two-thirds of all commercial television stations had a web site as of mid-1998

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(Savoie, 1998), it is safe to assume that every television station today in the United States maintains a dedicated website today.

Contrary to the predictions of technology determinists, a full-scale media substitution phenomenon between old and new media has not yet occurred, and a ''supplemental relationship'' still largely exists between the TV and Internet media (Jeffres et al., 2004). One way that local broadcasters could take advantage of such a supplemental relationship to help sustain challenges of a new digital media marketplace is by programming ''localism'' in their ancillary online service (Ha and Chan-Olmsted, 2004) to ensure their brand image and secure continued local audience patronage.

This study proposes to assess the market potential for webcasting program offerings as an ancillary interactive service from a local broadcaster. In particular, it evaluates audience interest in adopting webcasting services as a fluid Internet communication technology and the potential factors determining such audience interest.

2. Literature review

Past studies have shown that audience adoption of new media is contingent upon a number of cognitive, affective and behavioral factors. Depending on the research tradition, different aspects of these factors have been more or less emphasized in empirical studies from various information management and communication disciplines. In the field of mass communication, Internet-related research has been applying several major theoretical perspectives, including the uses and gratifications perspective, diffusion of innovations and media substitution (e.g., Atkin et al., 1998; Charney and Greenberg, 2002). A new conceptual framework, the theory of fluidity (Lin, 2002), has also been applied to studying emergent Internet communication systems such as webcasting.

2.1. Uses and gratifications perspective

The key concept in this theoretical perspective is that the individual is a self-motivating gratification-seeking audience, in other words, a more active rather than passive audience/user (Katz et al., 1973; Blumler, 1979). Audience gratification-expectations may include the pursuit of such cognitive and affective needs dimensions as surveillance, diversion, escape, informational learning, companionship, social identity, etc. (Lin, 1996).

This theoretical perspective has been utilized in a number of studies that examined new media adoption and uses. For instance, Ruggiero (2000) contends that audience adoption of new media and new media content is motivated by certain perceived gratification-expectations; these gratification-expectations are associated with certain goal-oriented adoption behavior. If adoption actually occurs and the gratifications-expectations are met through use, then future adoption can be reinforced due to the positive use experience.

Initial empirical studies have supported the validity and reliability of this theory in studying the adoption and uses of the Internet medium. For instance, James et al. (1995) examined electronic bulletin board use and cited informational learning and socialization as the two main motives behind such use. According to Sproull and Faraj (1995), email use and social group participation online can help gratify social interaction needs for online users. Miller (1996) reports that user motives such as (seeking) escape, entertainment, (social) interaction and surveillance (or news seeking) help explain online use. Jeffres and Aktin (1996) discover that the audience's ''need to communicate'' with others helps predict their interest in becoming Internet users. Eighmey (1997) reported that the entertainment value of commercial web sites and audience perception about their use experience was involving and relevant, helping contribute to their interest in accessing these respective web sites.

Ferguson and Perse (2000) suggested that the Internet can serve as a functional alternative to other media, in gratifying a set of cognitive and affective needs associated with traditional media use. Similarly, Lin (2001) contends that the uses and gratifications perspective should be suitable for examining audience adoption of Internet content, as the audience's general needs and motivations for media content adoption are found to be similar across both the television and Internet media. By implication, as webcasting content can be regarded as an audio-visual extension of existing web service features, audiences' perceived needs or gratifica-

tions towards webcast adoption may also be closely parallel to those of general web content uses. To test this assumption, the following hypothesis is proposed.

H1: Perceived webcast gratifications will be positively related to webcast viewing interest.

2.2. Media substitution hypothesis

The rapid diffusion of the Internet and the popularity of the World Wide Web quickly turned these technologies into a "place" where the audience can expect to seek information, entertainment, companionship and social interaction (e.g., Flanagin and Metzger, 2001). Fearing the erosion of their audience base to online media outlets, major newspapers and magazines – as well as radio and TV networks and stations – have all ventured into the web to compete against those dedicated media emulators on the web. As a case in point, nearly 2.7 million audiences access the online magazine Salon, which also has an audio component, on a monthly basis (Saunders, 2001). Hence, this "fear" of being "substituted" by competing online "look-alike" is not baseless, as advertisers already spread their wings to the online world. And as of this writing, approximately 55 million or 22% of Americans went online to access audio and video content (Aribitron, 2005).

The intense competition in the media marketplace has made this "media substitution" mechanism an important factor for studying the dynamics in new media technology adoption. Past work has validated this hypothesis with different levels of support, depending on the media technology studied for this substitution dynamic. For example, Henke and Donohue (1989) found that the audience's real-time TV viewing experience can be displaced by VCR use, particularly, when the VCR is used for time-shifting purposes. Video rentals are also said to displace the audience's theater-going experience, when they are consumed for the purposes of home screening (Childers and Krugman, 1987).

Nonetheless, the threat of the web substituting or displacing what the traditional media are capable of offering in terms of popular mass appeal content, even though real, should not be overly exaggerated. Lin (2001, p. 24), suggests that the substitution mechanism is primarily a function of perceived relative advantage in the areas of "superior content, technical benefits and cost efficiency," when comparing the new technology to the old. Hence, when "perceived relative advantage" of a new technology reaches beyond a "benefit threshold" or a tangible "payoff point," then media substitution is likely to occur. Different individuals can reach this "benefit threshold" at different times, some earlier than others.

Different media technologies may also be associated with different "benefit thresholds", as some are decisively more substitutable (e.g., compact discs displacing plastic LPs), while others are not (e.g., DVDs supplementing VCRs) (Rubin and Eyal, 2002). For example, Lin (2004) reported that webcasting adoption was predicted by the perception that radio and newspaper content is substitutable by the similar Internet content. But webcasting remains in its infancy and does not compete directly with those traditional media outlets that generally have both the depth and the breadth shrouded with "quality" imbedded in their content offerings. Nonetheless, it is possible that webcasting may substitute for broadcast or print content in selected content areas where the webcast is either at least as good as such content or if it is the only thing available via a webcast. To verify these propositions, the following four hypotheses are proposed.

H2a: Internet substitution of newspaper content will be related to webcast viewing interest.
H2b: Internet substitution of magazine content will be related to webcast viewing interest.
H2c: Internet substitution of radio content will be related to webcast viewing interest.
H2d: Internet substitution of television content will be related to webcast viewing interest.

If webcasting is to replace certain broadcast contents, the next question would be what types of offline media content or program genres will most likely to be substitutable. Kayany and Yelsma (2000), for instance, reported that even time spent with television viewing, telephone use and newspaper reading was displaced in relative terms due to online use, newspapers were still more valued for their entertainment and information content than online media sources. Lin et al. (2005) discovered that the displacement mechanism existed between (1) reading health/fitness news content via online news sources and offline newspapers, (2) listening to opinions/commentaries via radio webcasting and offline radio, and (3) watching science/technology news

via cable news channels and news webcasting. Lin et al. (2005) pointed out that speed and convenience were the two relative advantage functions that motivated online news users to both displace and supplement offline news content. In the only study that examined webcast genres, Lin (2004) found that interest in accessing shopping- and recreation-related webcasts was predicted by the perception that magazine content is substitutable by the similar content online. To further explore these media substitution dynamics, the following research question will address webcast program and viewing interest related queries.

RQ1: Which program genres will be positively related to webcast viewing interest?
RQ2: What is the interest level in webcast viewing overall and in different content categories?
RQ3: What is the actual webcast viewing pattern and what are the preferred content categories?

2.3. Technology fluidity

The theory of technology fluidity posits that the fluidity of a communication technology is instrumental in generating a fluid communication flow and a dynamic communication experience (Lin, 2002). This physical fluidity is defined by how easily a medium can take on a different communication modality (i.e., text, data, graphics, audio and video) to shape, transmit and receive communication via a variety of delivery systems. Applying this concept to examine mediated communication technology, it is easy to see that some communication technologies are more fluid than others. For instance, the Internet has the ability to switch from one media mode to another (or from one type of software platform to another), and it also can return (or recoil) to any previously downloaded site/page in any media mode upon command. Hence, it contains the "recoil" function that is essential for it to preserve the fluidity of its communication flow and a dynamic communication experience for online users.

In the context of communication research, the fluidity principle has been indirectly examined in the areas of information management system designs (e.g., Rafaeli and Sudweeks, 1997; Watson et al., 1998). Examples of fluid communication technology can include an "intelligent" telephone system or desktop videoconferencing unit that can encode and decode text, graphic, audio and audio-visual communication content for reception and transmission; or a multimedia computer system that can perform similar functions when networked.

In the present study context, webcasting or streaming audio-visual material on the Web is one of the most "fluid" forms of Internet communication. This is because webcasting or streaming video technologies can incorporate text, data, voice, audio and visual information, in addition to allowing these different content formats to flow from one to another and vice versa. Webcasting technology's fluid nature is what makes this mode of communication suitable for substituting those media contents (e.g., television programs) that can only be delivered in a "static platform", which does not allow easy changes of either the content or the software platform. Therefore, it is reasonable to speculate that those who prefer media fluidity would also be more interested in adopting the webcasting technology. The following hypothesis is postulated to verify this speculation.

H3: Perceived fluidity of the web will be positively related to webcast viewing interest.

Recent studies showed that demographic variables were either weak or inconsistent indicators of new media technology adoption (Reagan, 2002) and broadband Internet connection (Anderson et al., 2002) – the corner stone of webcasting adoption. For these reasons, the present study decided against making assumptions about the role of demography in influencing webcast adoption – which is an extension of Internet adoption. Nonetheless, the relations between Internet-use frequency/level remain a good predictor of the degree of involvement a user has with the online media universe. Hence, the more avid Internet users are also expected to have greater interest in adopting webcasting.

H4a: Internet-use frequency will be positively related to webcast viewing interest.
H4b: Internet-use time will be positively related to webcast viewing interest.

3. Methods

Study data were collected via a national online survey. A volunteer sample of local broadcast stations was solicited to have the survey posted on their station web sites. Some 28 stations participated in the study nationwide, which yielded a total of 766 online survey responses within a one-month period. It should be noted that the national sample of this online survey might be more homogeneous than heterogeneous relative to a national probability sample. A verification mechanism was built into the online survey to filter repeated entries from the same respondent.

3.1. Research instrument

There are three clusters of questions included in the survey. The first cluster of questions assesses the theoretical constructs tested in the study; the operational definitions for these constructs are as follow.

Gratification-expectations. Respondents were asked to indicate whether they are interested in viewing locally originated online broadcast based on a list of 18 gratification expectations items (see Table 1), using a 5-point Likert-like scale ranging from "Very Often" to "Never". Principal component factor analysis procedures (with varimax rotation) generated three factor components, which were constructed into the following gratification-expectation dimensions: "infotainment" ($\alpha = .94$) "diversion" ($\alpha = .90$) and "interpersonal communication" ($\alpha = .96$).

Technology fluidity. There were 13 items used to gauge this construct (on the same 5-point scale described above). These items reflected respondent perception of how fluid the Internet technology was in allowing them to complete various tasks online. The factor analysis procedure clustered all 13 items (see Table 2) under a single factor component. These 13 items were used to construct the "technology fluidity" scale ($\alpha = .95$).

Media Content Substitution. This concept was measured by asking the respondent whether webcast content access can "substitute" (coded as "0") for or "supplement" (coded as "1") the newspaper, magazine, radio or TV content that consumed offline.

A second cluster of questions contains three sets of items. They are operationalized as follow.

Overall viewing interest. A single item asked the respondent about their overall interest level in accessing online broadcasting (coded on a 10-point scale).

Table 1
Principal component analysis of viewing gratification expectations

	1	2	3
	Infotainment	Escape	Interpersonal communication
Will be a lot of fun	.64		
Will be interesting	.84		
Will be entertaining	.77		
Keep you current on local news	.84		
Keep you current on community events	.76		
Provide useful info	.85		
Help you explore new things	.79		
Help you broaden knowledge	.84		
Will be relaxing		.63	
Spice up down time		.69	
Help kill boredom		.79	
Help you escape		.83	
Help keep your company		.81	
Help keep you occupied		.81	
Current local retail sales			.52
Give you things to talk about with family			.85
Give you things to talk about with friends			.86
Give you things to talk about with others			.85
% of variance explained	32.36	24.18	17.68

Table 2
Principal component analysis of the technology fluidity construct

	Component
	1
	Technology fluidity
Move across print, audio and video content modalities	.75
Surf across news, information and entertainment content	.84
Communicate interpersonally via chat, mail or fax	.63
Upload and download product/service orders	.69
Get any news content you need	.86
Get any information content you need	.87
Get any entertainment content you need	.82
Access any items you need anytime	.86
Review any items you need anytime	.88
Search any archive items you need anytime	.87
Freely flow from one subject to the next	.84
Make the medium into what you want it to be	.78
Take anything from it and make it into something else	.61
% of variance explained	63.21

Webcast category viewing interest. Respondents were queried about their interest in viewing a list of 18 selected content categories (coded on a 10-point scale). The principal component factor analysis yielded five components. The "sports games" item did not have a significant loading on any of the five components and thus was eliminated (see Table 3). The remaining 17 items were used to construct the following webcast content categories: newscasts ($\alpha = .72$), tourism ($\alpha = .89$), retail/advertising ($\alpha = .83$), local entertainment previews ($\alpha = .86$), and government/court coverage ($\alpha = .85$). An open-ended question was also posed to solicit preferred webcast contents from the respondent.

Webcast-access experience. Audience webcasting access experience was measured by a single item (coded as "yes" or "no").

The third cluster contains Internet-use activity items and other background variables.

Table 3
Principal component analysis of webcast program genres

	Components				
	1	2	3	4	5
	Tourism	Entertainment preview	Retail/classified advertising	Government/court sessions	Newscasts
Newscast					.82
News magazine shows					.53
Live traffic report					.39
Live weather forecast					.65
Live city beat					.47
City council sessions				.87	
State congress sessions				.88	
Municipal court sessions				.80	
Local restaurant tour	.81				
Local tourist site	.86				
City tour	.84				
Movie trailers		.88			
Stage show trailers		.85			
Concert previews		.73			
Local retail shopping			.64		
Local video classifieds			.78		
Local event booking			.63		
% of variance explained	16.33	15.34	14.86	14.03	10.74

Online-use time. The amount of time spent online per Internet-use session was measure in hours and minutes.

Online-use frequency. This concept was measured by the number of times the respondent went online on a weekly basis, ranging from one to seven days per week.

Demographic background. Respondents' age, gender, annual household income and education level were assessed.

Media use frequency. Respondent media use pattern was measured by (1) the number of hours spent with television and radio per weekday and weekend day, (2) the number of days spent on reading a newspaper and a magazine per week, (3) the number of videos rented per week, and (4) the number of times for movie attendance per month.

4. Research findings

Demographic characteristics for the sample indicate that some 55% of respondents were males, 62% are married and 40% have children. An average respondent for this survey was about 32 years old with an average annual household income at about $38,000. The average education level for the sample was ''some college'', with 39% having completed over 14 years of schooling.

With regard to average media usage level, the sample appears to be a heavy media user group. Respondents reported reading a magazine and a newspaper at least 2 days and 3 days per week, in that order. These respondents also were heavy radio and television users – tuning in 4.2 h and 3.8 h daily, respectively. Moreover, they rented 5 videos per week and went to the movies once a month.

These respondents are also avid online users. Average number of days going online for them is 6 days per week and average time spent online each access session is 2.7 h. Moreover, 18.5% of the sample accessed webcasts in the past and overall viewing interest for the entire sample was an ''8'' out of a 10-point scale.

Pearson correlation results in Table 4 were used to test all of the hypotheses and some of the research questions. The multiple regression results in Table 5 provided additional analyses to further the interpretation of the data. All predictors for the regression equation, as specified by each research hypothesis or research question, were entered into the model in a hierarchical manner. These predictors included the indexes or measures for technology fluidity, gratification expectations, media substitution, webcast content categories as well as online use time and frequency. The order of entry for these predictor variables, reflective of different conceptual blocks, was based on their theoretical relevance to the criterion variable.

H1 postulates that gratification expectations will be positively related to overall webcast viewing interest. As all three gratification-expectation indicators – infotainment ($r = .38$, $p \leqslant .001$), escape ($r = .36$, $p \leqslant .001$) and interpersonal communication ($r = .30$, $p \leqslant .001$) – were significantly correlated with the criterion variables, all three indicators were entered into the regression equation. These results provided support for H1.

Table 4
Correlations between webcast viewing interest and other variables

	Overall viewing interest	$p \leqslant$
Technology fluidity	.312	.001
Infotainment	.377	.001
Escape	.360	.001
Interpersonal communication	.298	.001
Newspaper content substitution	−.039	n.s.
Magazine content substitution	−.006	n.s.
Radio content substitution	−.192	.001
TV content substitution	−.140	.004
Retailing/classified advertising webcasts	.271	.001
Tourism webcasts	.213	.001
Entertainment previews webcasts	.188	.001
Government/court sessions webcasts	.190	.001
Newscasts/webcasts	.361	.001
Time spent online each use	.178	.001
Days spent online each week	−.028	n.s.

Table 5
Multiple regression analysis of overall webcast viewing interest

Entry step	Beta	R^2	Adjusted R^2	R^2 change
Step 1				
Technology fluidity	.39***	.15	.15	.15***
Step 2				
Technology fluidity	.26***			
Infotainment-gratification expectation	.02			
Escape-gratification expectation	.30***			
Interpersonal-communication gratification expectation	.03	.24	.23	.09***
Step 3				
Technology fluidity	.26***			
Infotainment-gratification expectation	.01			
Escape-gratification expectation	.29***			
Interpersonal-communication gratification expectation	.02			
Newspaper content substitution	.03			
Magazine content substitution	.01			
Radio content substitution	−.10			
TV content substitution	−.01	.25	.22	.01
Step 4				
Technology fluidity	.28***			
Infotainment-gratification expectation	−.07			
Escape-gratification expectation	.31***			
Interpersonal-communication gratification expectation	−.06			
Newspaper content substitution	.01			
Magazine content substitution	.05			
Radio content substitution	−.15*			
TV content substitution	−.01			
Retail and classified advertising webcasts	−.01			
Tourism-related webcasts	−.02			
Entertainment preview webcasts	−.01			
Government/court coverage webcasts	.17**			
Newscasts/webcasts	.23***	.33	.29	.08***
Step 5				
Technology fluidity	.27***			
Infotainment-gratification expectation	−.05			
Escape-gratification expectation	.30***			
Interpersonal-communication gratification expectation	.06			
Newspaper content substitution	.01			
Magazine content substitution	.05			
Radio content substitution	−.15*			
TV content substitution	.00			
Retail and classified advertising webcasts	−.01			
Tourism-related webcasts	−.03			
Entertainment preview webcasts	−.01			
Government/court coverage webcasts	.18**			
Newscasts/webcasts	.22***			
Number of hours online daily	.11**	.34	.30	.01*

The multiple regression results indicated that only "escape" ($\beta = .30$, $p \leqslant .0001$) emerged as a significant predictor of webcast viewing interest, explaining 9% of the total variance. By contrast, infotainment and interpersonal communication gratification expectation were insignificant predictors of webcast viewing interest. This suggests that Internet users primarily sought gratifications from viewing webcasts that can help them attain the affective state of relaxation, escape, diversion, being occupied and companionship.

H2a, H2b, H2c and H2d posit that Internet substitution of respective newspaper, magazine, TV and radio content will be positively related to webcast viewing interest. The indicators for Internet substitution of radio

($r = -.19$, $p \leqslant .001$) and TV ($r = -.14$, $p \leqslant .01$) content were significantly correlated with overall viewing interest, but the indicators for Internet substitution of newspaper ($r = -.04$, $p > .05$) and magazine ($r = -.01$, $p > .05$) content were not significant correlates of overall viewing interest. Therefore, H2c and H2d were supported by these findings but not H2a and H2b.

All four indicators were entered into the regression equation, the results showed that Internet substitution for radio content ($\beta = -.15$, $p \leqslant .05$) was the only indicator found to be a significant predictor of webcast viewing interest, accounting for only 1% of the total variance. This finding implies that the Internet users who substituted offline radio listening with online-radio listening were also more interested in viewing video webcasts. But accessing news, magazine and TV content online has not yet fully materialized to substantively substitute their offline counterparts and was not significantly relevant to determine webcast viewing interest.

H3 tests the assumption that the perceived fluidity of the web will be positively related to webcast viewing interest. Perceived fluidity surfaced as a positive correlate ($r = .31$, $p \leqslant .001$) with overall viewing interest, providing support for H3. It also emerged as a significant predictor of webcast viewing interest ($\beta = .39$, $p \leqslant .001$) in the regression model, helping to explain 15% of the total variance in the equation. This finding thus signifies that those Internet users who perceived the web as a highly fluid medium based on their personal belief and experience are also the more interested webcast viewers.

H4a speculates that Internet-use frequent will be positively related to webcast viewing interest. Internet-use frequency (or the number of days one goes online per week) was not significantly correlated with the criterion variable. H4a hence was not supported. This was not surprising, as 70% of the respondents went online at least 6 days per week and the average of online frequency was also 6 days per week. This skewed distribution helped explain the lack of statistical variance here. In light of this discovery, it was decided that Internet-use frequency would not be used as a predictor.

H4b predicts that Internet-use time will be positively related to webcast viewing interest. As predicted, Internet-use time (or the amount of time spent on each Internet-use session) was significantly correlated ($r = .18$, $p \leqslant .001$) with the criterion variable. H4b is thus supported by this finding. Internet-use time was also found to be a significant predictor of webcast viewing interest ($\beta = .11$, $p \leqslant .01$), accounting for a small (1%) amount of the total variance explained in the regression model. This indicates that those online users who spent longer duration each time they went online were also more interested in watching webcasts.

Turning to RQ1, which examines which program genres will be positively related to webcast viewing interest, it was revealed that all five webcast content categories – retail/advertising ($r = .27$, $p \leqslant .001$), tourism ($r = .21$, $p \leqslant .001$), local entertainment previews ($r = .19$, $p \leqslant .001$), government/court sessions ($r = .19$, $p \leqslant .001$) and newscast ($r = .36$, $p \leqslant .001$) – had a significant correlation with the criterion variable. The regression results demonstrated that only two program genres – government/court sessions ($\beta = .18$, $p \leqslant .01$) and newscast ($\beta = .22$, $p \leqslant .001$) – were significant predictors of webcast viewing interests and helped explain 8% of the total variance in the model. Therefore, information-oriented webcasts seemed to attract greater viewing interest than other more entertainment (i.e., local entertainment previews) or marketing-oriented (i.e., retail/advertising) webcasts.

Fig. 1 presents the findings that address the query of RQ2, which intends to assess audience interest levels for webcast viewing overall and different content types. The overall audience interest level registered highly at an average of 8 (on a 10-pint scale). It appears that newscasts (also measured on a 10-point scale) elicited the highest level of interest ($M = 8.7$), followed by live weather forecasts ($M = 8.6$), live traffic reports ($M = 6.9$) and live city beat reports ($M = 6.1$). These categories of strongest viewing interest reflect the audience "surveillance" interest. Middling levels of viewing interest were observed for sports games ($M = 5.5$), news magazines ($M = 5.4$), concert previews ($M = 5.4$), movie trailers ($M = 5.1$), city tours ($M = 4.9$), local event booking ($M = 4.9$), local retail shopping ($M = 4.9$), local tourist site tours ($M = 4.8$), video classified ads ($M = 4.8$) and local restaurant tours ($M = 4.5$). This bundle indicates audience interest in both local recreational/entertainment opportunities as well as e-commerce. The lowest interest levels associated with: stage show trailers ($M = 4.2$), municipal court sessions ($M = 4.1$), state congress sessions ($M = 3.8$) and city council sessions ($M = 3.8$). This last cluster seemed to reflect a combination of those Internet users who were interest in live theatre performances as well as local politics and legal affairs.

Figs. 2 and 3 combined provide the answers to RQ3, which addresses the questions of the actual webcast viewing pattern of the sample and what respondents' webcast program genre preferences were, respectively. In
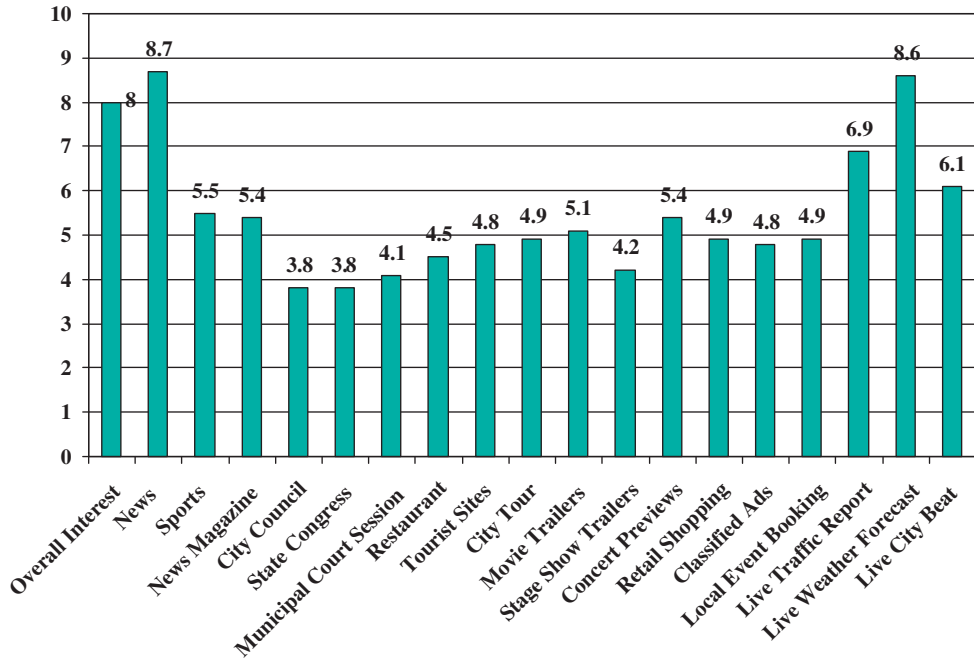
Fig. 1. Interest in watching different types of webcast programs (10 – highly interested).
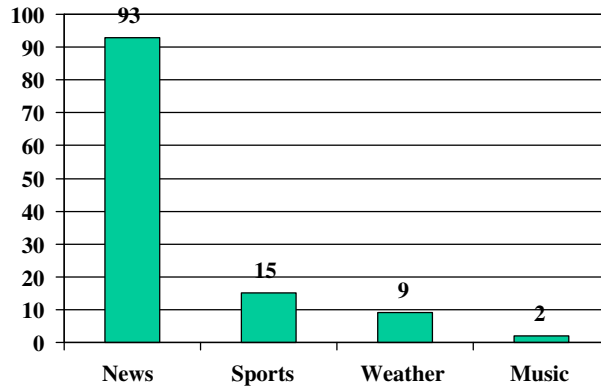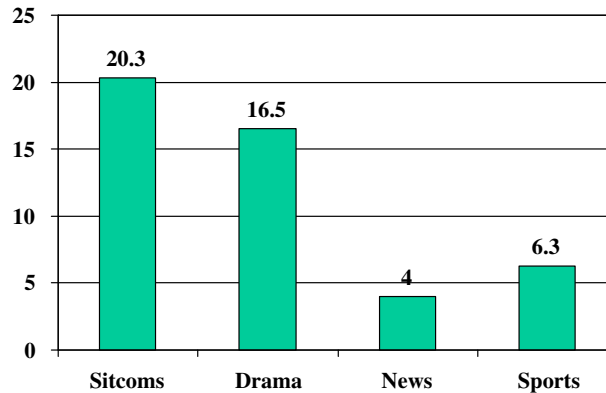

Fig. 2. Actual program types watched (%).

Fig. 3. Most frequently mentioned other programs of interest (%).

particular, Fig. 2 illustrates actual webcast access levels across different program types by adopters as follows: news (93% of online respondents), sports (15%), weather (9%) and music (2%). In contrast, Fig. 3 shows the respondents' self-reported webcast program types of interest, in which sitcoms (23%) were the mostly frequently mentioned program content of interest – followed by dramas (16.5%), sports (6.3%) and news (4%). The overlapped categories of news and sports hence helped verify the most watched webcast genres by the Internet users as a whole.

5. Discussion

This study set out to explore what might be the webcasting content that would interest Internet users most and what some of the reasons why these users would view such content. Findings suggest that those Internet users who considered the web as a highly fluid technology due to the web's capacity to be a multiplatform and multitasking medium were also most interested in webcast adoption, confirming the limited existing literature (e.g., Lin, 2004). The technology fluidity concept, as operationalized in this study also echoes past study findings that emphasize how user perception of the utilitarian attributes of a technology innovation (e.g., Agarwal and Prasad, 1997) was an important impetus for innovation adoption. For instance, Davis et al. (1989) technology acceptance model, which proposes that perceived ease of use and usefulness of a technology are the primary predictor of organizational technology acceptance, adoption intention and adoption behavior.

A closer examination of the Internet as a highly fluid medium indicates that it is not uncommon that a savvy Internet user could be chatting with friends through instant messaging, emailing a set of news photos to some colleagues, downloading a satellite map, checking the weather forecast and watching the newscast of a developing natural disaster story back and forth concurrently. This scenario could easily take place with other topics such as fashion, music, movies, sports or a space shuttle launch as well. The web's fluid nature allows it to be both an information and communication medium. In addition, web content can be transmitted and received via a wired and wireless network or a combination of both across national borders. Hence, the fluidity of the Internet technology also affords its users a higher degree of technology of freedom relative to other forms of communication technologies, as it allows the user to reinvent or generate creative application of the technology.

Aside from the technology-based utilitarian reasons for adoption, other cognitive and affective motivations were also found to be relevant to the adoption of webcasting technology. As a case in point, user gratification expectations of webcast use such as infotainment, escape and interpersonal communication are moderately strong correlates to their overall webcast viewing interest. These types of webcast-use gratification expectations are not different from those associated with traditional media use. Specifically, user expectation that viewing webcast could help fulfill their mood management needs, including escape, relaxation, boredom relief, diversion and companionship, was found to be a moderately strong predictor of webcast viewing interest. Hence, even though the web is seen as a source for information seeking, gathering and sharing, a channel of interpersonal communication (Tidwell and Walther, 2002), a network for social interaction (Caplan, 2002), and an outlet for entertainment – the most important gratifications the Internet users intended to extract from their webcast viewing experience – was to satisfy their affective needs above all else. Hence, this finding is also similar to that of Ferguson and Perse's study (2000), which contends that the web can act as a functional alternative for its users to receive affective gratifications that they otherwise could have obtained from accessing traditional media such as television programs. This then leads to the next question regarding what types of webcast content were considered to be the major source that could help meet users' gratification expectations associated with adopting a functional alternative to traditional media content.

Fig. 1 provides the frequency distribution of the level of viewing interest with regard to each of the different program types to which the Internet users in this study responded. It appears that news-oriented webcast categories such as news, weather, traffic reports, city beat, sports and news magazine were the most preferred programs. The only other two program types that were ranked above "5" on the 10-point scale in terms of viewing interest were movie trailers and concert previews. These two types of webcasts were usually produced by national distributors or promoters of these events instead of local stations.

Not all of these preferred program genres held up as significant predictors of webcast viewing interest. As reported in the findings section earlier, all five webcast content genre indexes generated based on the local pro-

gram content categories developed for this study – including news programs, government and court coverage, retail/classified advertising, tourism and entertainment previews – were significantly correlated with webcast viewing interest. Only news and government/court coverage programs – including news, news magazines, live traffic reports, live weather forecast, live city beat, city council meetings, state congress sessions and municipal court-session coverage – turned up as significant predictors of webcast viewing interest.

At first look, these findings might seem somewhat contradictory to the discussion above, which pointed out that affective need gratifications were the primary psychological motivators for webcast adoption. There are two possible interrelated explanations for this phenomenon. First, as local stations are still lagging far behind in providing webcast services, compared to their national counterparts (e.g., the major media conglomerates or national sports leagues), they typically offered webcast programs that they were already producing offline to attract the Internet users. These types of programs usually comprised of local news and public affairs programs. Second, as local stations regularly promoted these news and public affairs programs as their online offerings, it is not inconsistent that users would respond to these programs as the reason for choosing to access the station's webcasting service.

It should also be noted that these locally produced news-oriented webcasts, including newscast, local government sessions (e.g., city council hearings) and local municipal court sessions, tend to focus on the more sensational local political issues or criminal cases. Hence, these types of webcasts could perhaps fulfill a voyeuristic information need for their viewers, which could in turn help satisfy their diversion and escape-gratification expectations. Furthermore, it should be pointed out that the other three program genres tested in the present study were tailored to promote local tourism, local entertainment events and local retail shopping. Unfortunately, these types of localized webcast genres remained either unavailable or underdeveloped at this point.

With regard to what types of webcast programs that Internet users have been accessing, Fig. 2 showed that while nearly all of the webcast viewers watched the news online (93%), 15% accessed sports newscasts, 9% looked up weather forecast, and another 2% chose to view music videos. Comparing these results to what types of webcast programs that the Internet users would choose to watch, when given the choice, the open-ended question yielded the results that were somewhat different from what was currently available at the local station level. Fig. 3 illustrated that the preferred program genres reported include: situation comedies (20.3%), dramatic series (16.5%), news (4%) and sports (6.3%). Even though providing original entertainment television programs such as comedies and dramas is not likely for local stations, these stations could help link web users to the entertainment programs offered by their affiliated network online much the same way that they help distribute these networks' programs offline (Barnes, 2006).

Based on these findings, the webcast content categories that were accessed by the study sample – news, sports, weather and music – were similar to those reported by the most recent Arbitron study (2005). As large media conglomerates (e.g., Yahoo, AOL, ABC, CBS, NBC, FOX, CNN, Discovery Channel, MTV, etc.) and major professional sports leagues (e.g., NFL, MLB) have been offering a small but steadily growing number of programs online either for free or for a fee since 1999 (Crouch, 1999; Barnes and Brant, 2005), the recent trends have expanded to offering webcasts to hand-held devices (e.g., mobile phones or video I-Pod) wirelessly (Yuan, 2006). The most intriguing questions remain to be whether these online webcasts would displace some of their offline counterparts and to what extent.

The present study revealed that those respondents who consider newspaper, magazine, radio and television content substitutable by online media content were also more interested in webcasting. However, only radio content substitution was founded to be the only significant predictor for webcast viewing interest. This finding is not surprising, as many web users have been listening to online radio and downloading music files (Aribitron, 2005). However, the much talked-about and feared media substitution phenomenon between traditional media and online media content remains relatively limited. Specifically, only 14.5% of the respondents reported radio content substitution by online content, and 12.5% did so for TV content substitution. These percentages were relatively comparable to the Internet radio and video access frequencies reported by the recent Aribitron (2005) study, which indicated that about 15% of the Internet users listened to Internet radio and nearly 14% watched Internet video, during the past month.

Lastly, the amount of time respondents spent online for each use and the number of days that they went online each week were significantly correlated with webcast viewing interest. Only the former emerged as a

significant predictor of webcast viewing interest. Therefore, it is the duration of each visit (or use) not the frequency of visits that helps determine whether an Internet user is likely to watch a webcast. These findings then suggest that heavy Internet users are not necessarily webcast viewers. Only those Internet users who are sufficiently motivated to watch a webcast would devote enough time to do so, especially if the webcast content is also easily available offline.

As a growing number of audiences using a digital video recorder (DVR) – which has a minimum of 80-h recording time – to record TV programs, the DVR (which is present in about 7% of the U.S. households in 2005) has turned the television into a viewer-directed "on-demand" medium (Elliot, 2006). Nonetheless, the use of a DVR is confined by location and requires a certain amount of dedicated time/effort. By comparison, the Internet is a truly "on-demand" medium, as it is not bound by geographic location nor does it require any extra equipment. This suggests that for those individuals who value the "anytime anywhere" on-demand viewing experience (Noguchi, 2006), the mechanism of using web-delivered media content to substitute offline media content is more likely to occur than those who do not crave such convenience.

5.1. Study limitations

This study used a purposive sample that was composed of Internet users who were actual visitors of their local television station websites. Even though the use of a true random sample would have been more ideal, such a sample would be rather difficult to obtain. There is also not any existing database that could provide a proper sample frame as the basis for selecting such a national random sample. Due to the "newness" of this study subject, only 15% of the sample had local webcast viewing experience. Hence, the responses provided by the sample reflected the belief about and attitude towards webcasting instead of actual behavioral intent. By the same token, as local webcasting is still an evolving phenomenon in its infancy – relative to the webcasting infrastructures deployed by the large media conglomerates – the present study developed and tested a number of local webcast program genres based on the principle of localism. These program genres may or may not be what individual local stations will attempt to deliver to their own local audiences. For these reasons, the findings reported in this study should be interpreted with proper caution.

6. Study implications and conclusion

The Internet, a good source for accessing entertainment, infotainment and shopping services, appears to be a natural sphere for local broadcasters to obtain further branding advantages and additional advertising revenues. This scenario could easily become a reality, provided that the streaming video technology allowing for broadcasting over the Internet via satellites, high-speed digital telephone lines or cable services are made economically and technically viable for most Internet users. Alternatively, wireless applications of webcasting, using digital broadcasting technology or even spread spectrum imbedded within a local station's digital broadcast bandwidth to directly "broadcast" to audiences' personal computer/modem or hand-held units, may also be a viable option (Schwartz, 2000).

Ideally, a local station could establish its web site to become a type of "local portal" that serves as an entry to locally relevant Internet services featuring culture, businesses, news, information, entertainment, retail advertising, community events, etc., in addition to webcasting services. The branding advantages of such portal service are invaluable, as seen in the example of Yahoo, Google, MSN and AOL at a worldwide level. By implication, as the web and in this case webcasting generates more original programs or provides programs that are unavailable on a television screen (e.g., the first three episodes of *I Love Lucy*), it could potentially draw more and more users who prefer such diversely targeted pointcasting services (Needle, 1999). With the nature of the web allowing its users to make use of it in an individualized manner, this technology fluidity also enables it to deliver a wide variety of media products with mass-, narrow- or niche-content appeals – to target an infinitely large world-wide audience – with little to no additional cost.

It would appear that the future prospects for online media and webcast adoption are promising, as audiences increasingly become on-demand oriented and are acquiring on-demand content access. The findings presented by this exploratory study, hence, should help inform the broadcast industry to assess its potential webcasting audience and the dynamics of webcast diffusion. These findings should also provide a good initial

look at an emerging Internet-use phenomenon from a theoretical perspective, as they addressed both the nature of the technology and the motivations of technology adoption. As it is not difficult to envision the Internet being an integral part of the broadcast media service, future research should further explore the webcast content categories that will most likely to be embraced by Internet users, in addition to why Internet users would adopt webcasting, how such adoption will impact the economic landscape of traditional media, and what cognitive and affective impacts an on-demand media environment may have on its users (especially the youngest members) in society.

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