Digital Signage Feasibility Study

For Oxfordshire Community and Voluntary Action

The Student Consultancy

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Executive summary

This report is a detailed summary of our research as part of The Student Consultancy, performed in the service of The Oxfordshire Community and Voluntary Action group (OCVA). Our work was a feasibility study of the proposal to install digital signage in Abingdon as way of improving advertising of community events.

The first section introduces the background to our project as well as the methods we used for our research, which included discussions with OCVA representative Dave Butterworth, and Julie Downing, the manager of the Business Improvement District (BID) in Abingdon, as well as online research, and a street survey.

The second section of our report describes the street survey that we carried out in Abingdon. It took the form of seven questions that were aimed at finding out about the general profile of the respondents, their participation and interest in community events and finally about their view on the proposal to install digital displays around town. Our survey data concluded (1) that Abingdon residents and visitors are interested in community events, (2) advertising of community events in Abingdon is currently ineffective, (3) the digital display proposal has wide majority support, and (4) that the variety and quality of events in Abingdon may be inadequate.

The third section details our findings regarding software and hardware for digital signage. This includes an outline of how a digital signage setup works in terms of software and hardware: central management system (CMS) software, accessible online, is used to remotely manage and communicate with a series of display systems at locations of interest. A comparison of software services has led us to recommend Xibo or Mvix as the companies of choice for non-interactive digital signage software. The details of interactive digital signage are beyond the scope of this report given their expense, so we provide only a brief set of recommendations and considerations for the future. A hardware setup includes the display computer, monitor, mounting system, cables, and an internet connection. For the display computer, we recommend the *Plater Beelink Z83-II Mini PC* at £90 per unit or the *Azulle Quantum Access Plus PC stick* at £115 per unit. In the appendix, we provide a detailed comparison of the full set of software and hardware options as well as a list of technical considerations.

The fourth section covers the locations aspect of our project, in which we narrow down the list of potential locations for digital signage to five highly feasible and well-placed areas: The Tourist Information Office, the Library, Waitrose, R&R, and the Community FreeSpace.

The final section details the further steps and final recommendations that would be needed to bring

the digital signage proposal to fruition with the aim of improving advertising of community events. We recommend (1) to determine the necessary features of the digital signage system, (2) to perform a thorough assessment of planned locations for digital signage, (3) to complement digital signage with a strong online presence, and (4) to investigate the variety and quality of community events.

Introduction and methods

As part of The Student Consultancy, we have worked over the past weeks with our client, the Oxfordshire Community and Voluntary Action Group (OCVA), represented by Dave Butterworth, the Community Ambassador for Abingdon. OCVA is an umbrella body for the Oxfordshire voluntary and community sector, which acts as a focal point for all local community groups, supporting them with advice and training.

OCVA reports that local community groups in the town of Abingdon are struggling to inform people about upcoming events, potentially due to the poor quality of the town's official notice boards. A previous consultancy project found that there are many community groups in Abingdon, signifying that there is enthusiasm for community-organised events, but that the current forms of advertising are ineffective.

The proposed solution is to install digital signage in key areas around the town centre of Abingdon, as a way of improving advertising of community events. These displays, which should have high visibility and the capability to be updated centrally, should serve primarily as replacements for the current noticeboards around town.

Our goal was to research the feasibility of the digital signage proposal. The project focused around three aspects: (1) assessment of the Abingdon community's views on current event advertising and the proposal for new digital signage, (2) software and hardware recommendations for such signage, and (3) potential locations for digital signage. To support our research, we had discussions with Julie Downing, the manager of Abingdon's Business Improvement District (BID), and a supporter of the digital signage proposal.

To assess the community's views, we conducted a street survey with seven questions focusing on community events, advertising of events, and the proposed digital signage project. We collected a sample of 70 people in the Abingdon town centre.

We researched digital signage software and hardware by performing an online search and comparison of popular digital signage and computer companies. We focused our search by considering consumer reviews, overall popularity in Google search rankings, and target market. Based on criteria including features, ease of installation and management, and cost, we recommend specific software and hardware options. In addition, we compiled a list of technical considerations which we hope will be helpful when making a final selection.

We researched potential locations by searching a map of Abingdon and compiling a list of central points, considering members of the BID, and by physically surveying the Abingdon town centre. We assessed locations based on practical features (e.g., availability of shielding from the weather), interest from location managers, and strategic positions that would catch the attention of the local residents.

Abingdon street survey

We conducted a survey to assess opinions in Abingdon on community events, advertising of events, and the proposed digital signage project. Over two field visits, we gathered a total of 70 responses. Our survey consisted of seven questions. Questions 1 to 3 looked at the general profile of those in Abingdon as relevant for our study. Questions 4 to 6 specifically focused on opinions about community events and their advertising. Question 7 is an open-ended question for any elaborate responses or comments on community events in general. See the appendix for the specific wording of the questions and options.

A majority of those surveyed are Abingdon residents who go into town for shopping, and are not aware of Visit Abingdon

Of 70 respondents, 75% were from Abingdon, 14% were frequent visitors, and 11% were there on the off-chance (e.g., tourists). The vast majority (89%) of respondents are therefore frequently in Abingdon, and are the target group for community events advertising. As such, this is a relevant sample for the digital signage initiative.


"Why do you usually go into town?"
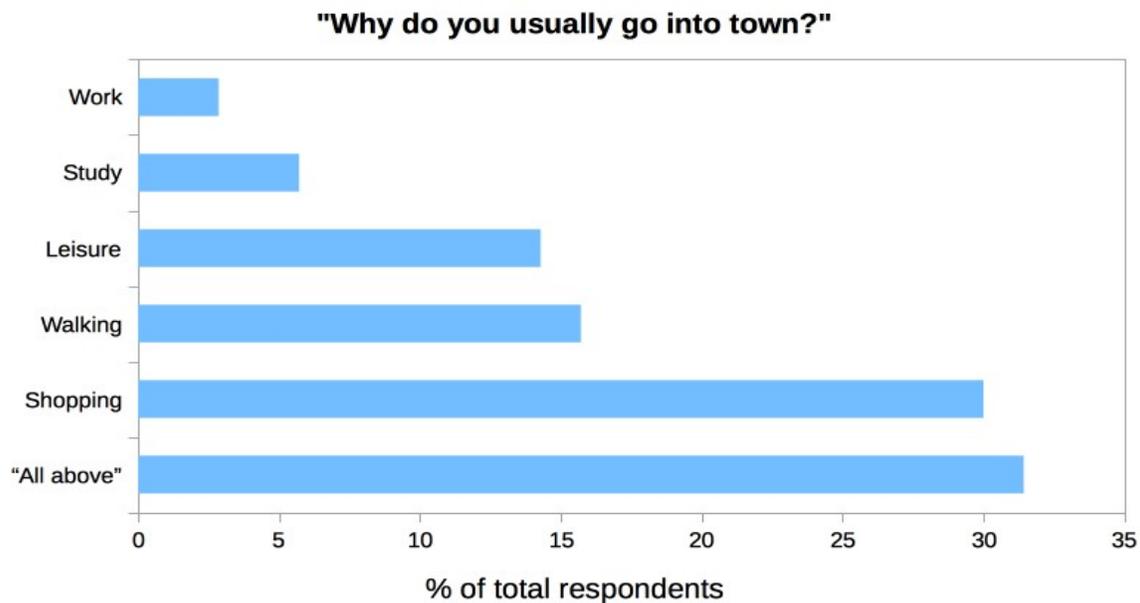
The most common reason for going into town is shopping. This is closely followed by walking and leisure, with almost 50% of respondents indicating either one of these individual reasons. These results indicate that the placement of digital signage should prioritise (1) areas outside shops, and (2) busy walking paths.

We also found that a significant percentage (70%) of respondents did not know about Visit Abingdon and its associated website, suggesting this method of advertising currently may not be reaching its target audience.

## A majority of respondents are interested in hearing about community events in Abingdon

"How interested are you in community events?"
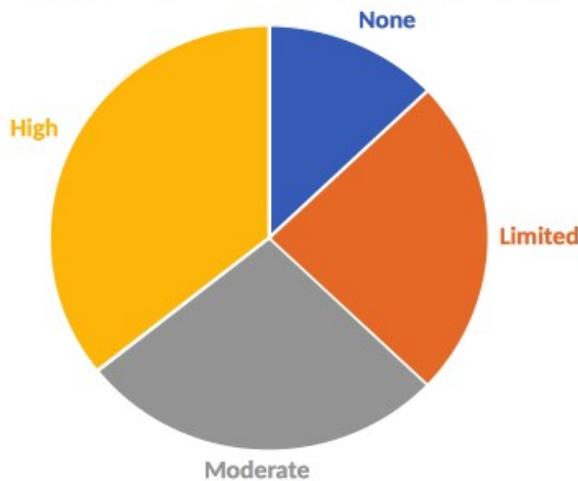
There is substantial interest in community events in Abingdon, with approximately ⅔ of respondents reporting high to medium levels of interest in such events. In particular, around ⅓ of respondents said that they would be highly interested in such events. It would thus be quite easy to increase participation in community events should the advertising work. We also found that the types of events that have the most interest include arts, music, and family-oriented events.

Just over half of respondents have participated in community events, most commonly hearing about them through word of mouth

"Have you attended any community events? If yes, how did you hear about them?"
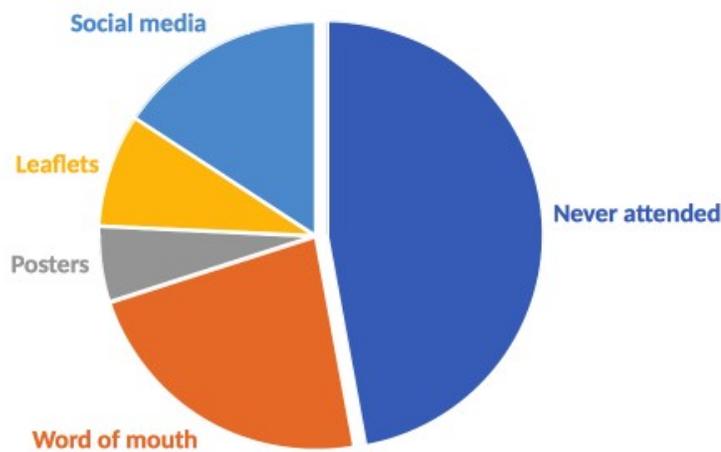
The proportion of respondents who have participated in community events (53%) versus those who have not (47%) is about the same.

Of those who have participated in events, the most common way they found out about said events was through word of mouth, followed by social media. 27% of those who have participated in events said they heard about them through either posters or leaflets. As digital displays are essentially electronic noticeboards, we propose to first make sure that the locations of the displays compared to current noticeboards is strategic so that people will use the displays as their primary source of finding out about community events. There was criticism voiced about the current noticeboards and that the one by the museum should be in a place where both sides can be used for advertising events. It would be useful as well to consider improvements to social media as a way of advertising community events since that is becoming a common way of finding out about events. This could be done by advertising the social media outlets themselves so that people will know where to look.

Qualitative data suggest negative opinions of events and advertising in Abingdon

Through our open-ended survey question, there was a sense that events in Abingdon are of poor quality and lacking in quantity. "Dead", "dull", and "boring" were common descriptions of the town.

It was unclear if this view was because events are lacking, or because of ineffective advertising, or both. One respondent mentioned that current efforts to liven up the town are "token gestures", and another said that Abingdon needs a "unique selling point". Similarly, it was mentioned that Abingdon is a "place to go to if not in Oxford".

Importantly, it was also commonly mentioned that current advertising is ineffective – "there is a disconnect in town", "difficult to find useful information online", "never heard of anything". One respondent said she was "unaware of much, even with reading the local magazine". It is possible that both *a greater variety of events* and *better advertising* are necessary in order to rejuvenate the current situation regarding community events in Abingdon.

Nearly 70% of respondents support the digital signage initiative
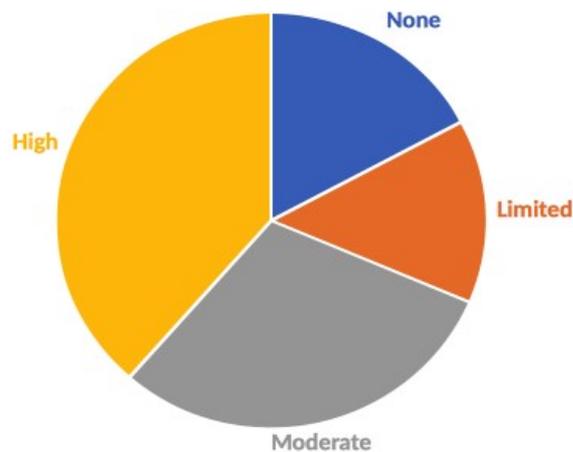
Initial response to the digital signage initiative was largely positive, with nearly 70% of respondents being moderately to highly interested in this initiative. "It would be nice to walk out and see everything", one respondent commented. At the very least, this indicates that there is some preliminary public support for the idea.

Some positive respondents also mentioned that digital signage would be best deployed in central areas where they can be easily seen. It should also be noted that some respondents were against the idea of digital screens as they felt it diminished the town's aesthetic but it can be said that there is a greater an overriding need to use technology in order to improve the current situation of community events advertising.

Key conclusions:

1. **There is a lack of effective advertising.** Many respondents bring up the difficulty of finding out about the various events that are going on. Many were interested in community events, but could not find information on events that they were interested in.

2. **There is a possible lack of a variety of events.** Respondents also indicated that they would like an increase in the variety of events such as festivals, fireworks, summer and open-air events, and more events targeting the youth of Abingdon.

3. **The digital signage initiative has a large majority support.** Although there were negative views on the initiative, the overall view was that it would be an improvement to the town's current methods of advertising community events.

4. **Location and visibility of digital signage is critical**. This needs to be carefully considered to have maximal impact on advertising.

Software and Hardware

Digital signage consists of central management system (CMS) software which remotely communicates with display systems in multiple locations

A digital signage setup typically consists of <u>central management system (CMS) software</u> which communicates (via internet access) with a series of <u>display systems</u> at the locations of interest. The CMS is software which is hosted on the internet. CMS software can be installed for an organisation on a physical, or more commonly, <u>digital server</u>. The CMS is accessed online through a web address (e.g., www.yourcompany.com/cms/) which contains a login screen for the administrator.

CMS software is typically offered as a Software-as-a-Service (SaaS) platform

Alternatively, many digital signage companies also offer a <u>Software-as-a-Service (SaaS)</u> platform, in which the CMS does not have to be installed and no servers are needed. Instead, a user account created on their online platform provides access to a CMS set up and hosted by the digital signage company (i.e., the administrator logs in with their account at www.digitalsignage.com/login/).

A display system consists of a monitor and a computer with internet access

At each location of interest, a display system consists of a <u>display monitor</u> connected to a <u>computer</u> which has access to the <u>internet</u> (Wi-Fi, or more stable wired Ethernet). On the computer, installed <u>display software</u> grabs content (e.g., a display layout with images, text, videos etc.) from the online CMS and displays it on the monitor. Once the display systems are set up and can stably connect to the CMS via the internet, there should be no need to interact with them – all content and scheduling is managed through the CMS which can be accessed online from anywhere.
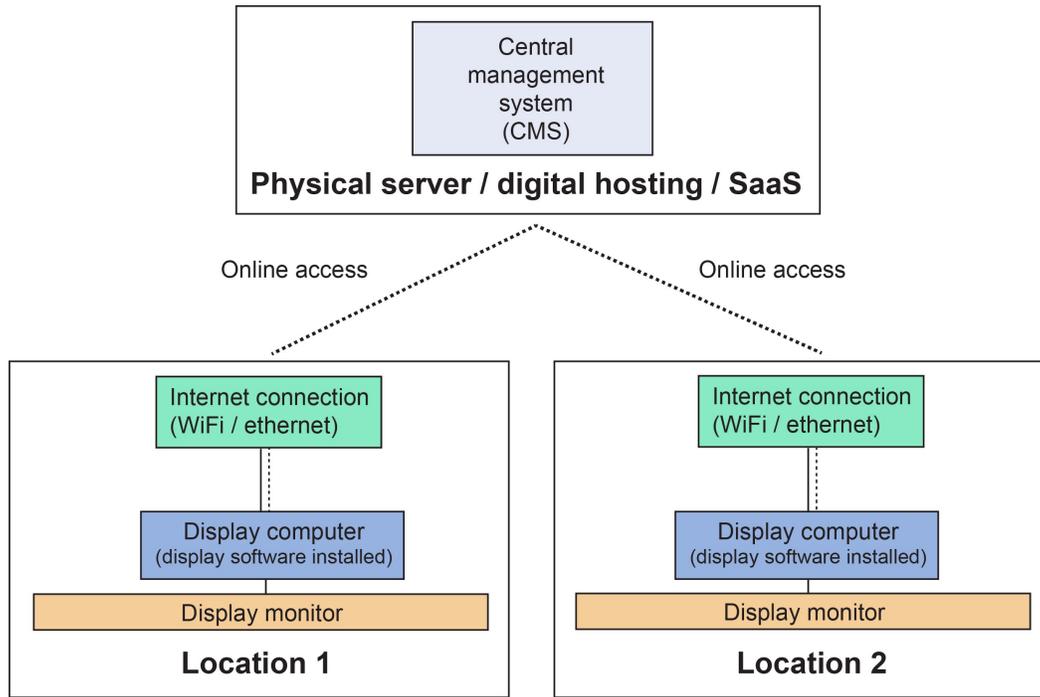
Digital signage software

Digital signage can be interactive or non-interactive

Digital signage can be <u>interactive</u> (users can click through options, maps, calendar etc.) or <u>non-interactive</u> (display only). Interactive digital signage requires space for users to stand and interact with the displays, and displays must be easily accessible by anyone (e.g., cannot be mounted too high). They also tend to be more expensive, and marketed towards large corporate clients. Non-interactive digital signage is more flexible in terms of its location and size, and there are several free and affordable non-interactive digital signage services available.

Non-interactive digital signage software (we recommend Xibo or Mvix)

In the free and affordable range, there are multiple companies offering entirely free products or limited free versions which may still be viable depending on the number of displays and features desired.

In the free and affordable range, we recommend *Xibo* because:

1. It offers all features and flexibility
2. It's affordable (and offers fully-functioning free version)
3. It's UK-based allowing for easy support with the paid version

The free version is identical to the paid version except the CMS requires own installation and hosting (straightforward for an IT technician), and does not provide access to official technical support. The paid version offers a CMS which is set up and hosted by Xibo on their servers. It costs £14.40 per display per year, which is the cheapest paid service we have found.

In the mid-to-high cost range, we recommend *Mvix* because:

1. It offers all features and flexibility (its CMS software has recently won an award)
2. It's affordable by offering the CMS software free with the purchase of display hardware
3. It's easy to set up the pre-configured display hardware

Mvix does not sell its CMS software independently, but rather requires customers to purchase display hardware which come bundled with it (see hardware section and appendix). Each display system is pre-configured with all necessary display software, making it easy to set everything up.

See appendix for detailed software comparison chart, and full list of technical considerations.

Interactive digital signage software is expensive and geared towards corporate clients

Interactive digital signage software tends to be sold in a customised format, so that the display is tailored to each client's requests. Companies also provide templates which can be used and edited by them as needed. The CMS software is usually similar to that for non-interactive digital signage but typically offers more options. Given the high cost of interactive digital signage, and the client-specific aspect of each product, companies do not provide up-front pricing and instead provide quotes. For example, *Mvix* provided a quote of £2500-3200 per interactive display which is assumed to be wall-mounted indoors.

See appendix for a full list of companies offering interactive digital signage options.

Digital signage hardware

A complete hardware setup for a non-interactive display consists of a display computer, monitor, mounts for monitor, cables, and internet connection (cabled or Wi-Fi). Interactive displays are typically sold by digital signage companies and come pre-configured with the display software. These tend to be far more expensive systems. Several companies offering interactive displays are mentioned in the software section, and our focus here is hardware for non-interactive digital signage.

Display computers come in many flavours and are very affordable

We found that the most viable options for display computers are mini PCs or PC sticks owing to their size, connectivity, RAM, and storage space relative to their cost. Mini PCs and PC sticks are small, palm-sized (or smaller) computers that plug into the back of monitors, which would be mounted or located on a desk top. Such display computers are suitable for non-interactive displays (interactive touch displays require a different setup altogether).

Our recommendations for display computers are:

- *Plater Beelink Z83-II Mini PC* because it's able to run Windows or Linux, powerful enough to support most digital signage, and is affordable at £90 per unit.
- *Azulle Quantum Access Plus PC stick* because of its compact size, ability to run Windows or Linux, powerful performance, and relatively low cost of £115 per unit.

These display computers are general-use computers, which means digital signage display software will need to be installed on them and configured to work (easy for an IT technician). Another option is the *Mvix Xhibit Mykro* which comes pre-configured with the display software from Mvix. It is relatively more expensive at £212 but comes with the unique benefit of being easy to set up with the Mvix CMS software (provided free with the hardware), and is guaranteed to run the digital signage smoothly.

See appendix for the full set of options and specifications.

Display monitors: consider readability and mounting options

We have provided a shortlist of affordable display monitors for mounting on walls and desk tops in the appendix. In the affordable range, screens are largely limited below 25". We recommend not choosing a screen below 20", especially for those mounted on walls, to ensure readability. We also do not recommend plasma screens (typically above 30"), due to the possibility of the screen becoming permanently damaged with a long-term static display (i.e., the image is "burned" into the screen). You may also like to consider whether the screens have speakers or not, especially for interactive displays depending on whether interactions with users requires sound.

Other hardware to consider and factor into cost

- HDMI cables may be needed to connect the computer to the monitor (dependent on display computer)
- Ethernet connections
- Type of mounting system depending on location and wall material
- Power cables and extensions
- USB slots on display computers required to accommodate accessories (mouse, keyboard)

See appendix for a full list of technical considerations.

Cost estimate summary

Option	Item	Cost	Total cost
1	Xibo software	£14.4 (per unit, annual cost)	£195 (per unit, one-time cost) + £14.4 (per unit, annual cost)
	Azulle Quantum Access Plus PC stick	£115 (per unit)	
	Acer 21.5" monitor	£80 (per unit)	
2	Mvix software	Free	£212 (per unit, one-time cost)
	Mvix Xhibit Mykro	£212 (per unit)	
	Acer 21.5" monitor	£80 (per unit)	

Location

We concluded from our research that the best potential locations for screens were the Tourist Information Office, the Library, Waitrose, R&R, and the Community FreeSpace in Bury Street. Below we have included photos of our recommended locations with mockups of digital displays.
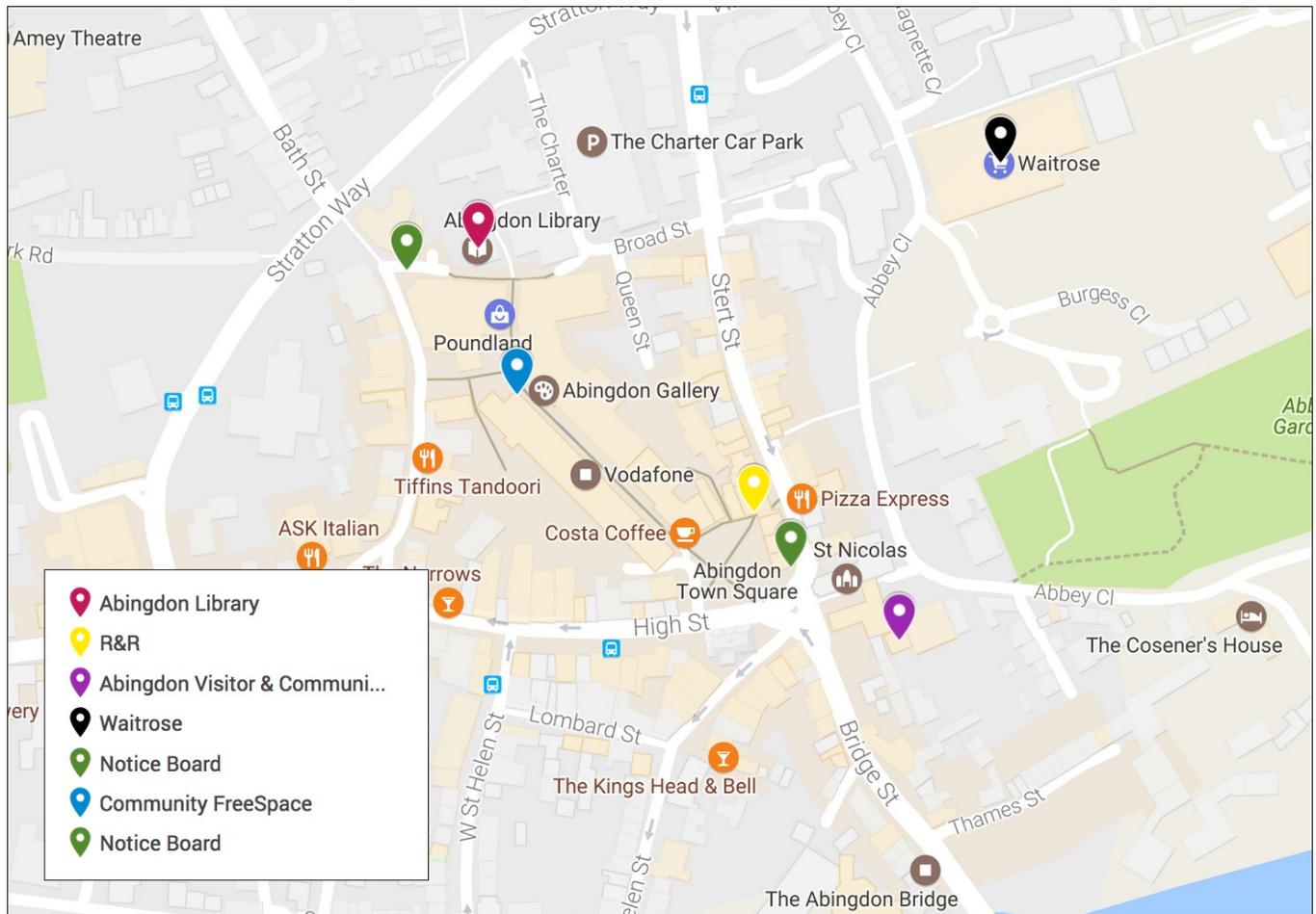
The Visitor Information Office is frequently visited by locals, often those seeking information about upcoming community events and so would be well-suited to house a display, as well as being receptive to the idea.

Visitor Information Centre

Abingdon Library

The library currently has two noticeboards in the entryway, advertising community events and groups, as well as folders containing information on local organisations. A display showing community events would complement these existing sources of information, and the library is frequented by local members of the Abingdon community. The library would need a written proposal before plans could be taken any further.

The Waitrose store is a common reason for residents coming into the centre of town, and as such, would be an ideal location to reach many community members. The store manager said that such a display would need to have permission from the head office, so a written proposal would be needed.

Waitrose

R&R Cafe

R&R is a local independent coffee shop, situated in Market Square, also running alongside a cut-through to Stert Street. R&R is a BID member and so likely to be receptive to an idea that would benefit the local community. We found R&R was keen on the idea and suggested the mural opposite the coffee shop in the cut-through as an alternative location as well.

Community FreeSpace

Cut-through (near R&R Cafe)

The Community FreeSpace, located in Bury Street, is designed for the use of local community groups to promote their activities and so is well-suited to house a screen promoting local community events. Currently, it is not being noticed by most of the residents so a display would help rejuvenate the community location itself.

In the early stages of our research we also considered the town museum, a local school, the sports centre, and outdoor locations such as a bus stop or in Market Square before ruling these out due to limited audiences, exposure to the elements, distance from the town centre, potential vandalism, and general infeasibility (e.g., in mounting displays).

Noticeboard #1

Noticeboard #2

Recommendations

Determine necessary features for digital signage

Our street survey indicated that advertising is ineffective in Abingdon. The digital signage proposal, according to respondents and local businesses, has support. There are many digital signage companies available and we have provided a range of recommendations. Prior to committing to a service, we advise to confirm that all necessary features (technical and otherwise) are available in terms of hardware and software.

Perform thorough assessment of planned locations for digital signage

Further, we advise to perform a further detailed assessment of the planned locations for digital signage, especially given that the project requires financial investment. Such an assessment should include a quantitative estimate of target audience exposure, and practical considerations like visibility, weatherproofing, and establishments' restrictions.

Complement digital signage with strong online platform

To complement the digital signage, a strong online presence for Abingdon community events should be established. This may be through the improvement and advertising of Visit Abingdon, or through a new service. In all cases, this online platform should be simple to find and easy to navigate for visitors. It should also be easy to update on the management side, and be easily accessible by community groups, either directly or indirectly through a dedicated administrator. Lastly, it should be well-integrated into popular social media services like Facebook and Twitter.

Investigate variety and quality of community events

Our street survey indicated that in addition to ineffective advertising of community events, the variety and quality of events may be poor, at least according to respondents. Further research is needed to confirm this and to determine the appropriate steps. One approach is to conduct a comprehensive analysis of all community events in Abingdon in the past several years and to assess them by attendance rates and other types of feedback. A set of focus groups with several town demographics may also be useful.

Appendix

Abingdon Street Survey: questions and raw data

Question	Response count
Are you from Abingdon, a frequent visitor to the town, or are you visiting on the off chance?	
Abingdon	52
Frequent	10
Off-chance	8
Why do you usually go into town?	
Leisure	10
Walking	11
Shopping	21
Work	2
Study	4
All of the above	22
Do you know about Visit Abingdon?	
Yes	21
No	49
On a scale of 1-4, 1 being not interested at all, 4 being extremely interested, how interested are you in hearing about community events in Abingdon? If interested, what kind events?	
1	9
2	17
3	19
4	25
Have you ever attended or participated in community events? If yes, how did you hear/find out of them?	
No	33
Yes - word of mouth	16
Yes - poster	4
Yes - leaflets	6
Yes - social media	11
On a scale of 1-4, 1 being not interested at all, 4 being extremely interested, how interested would you be in the idea of a few screens in the centre of town advertising community events in Abingdon?	
1	12
2	10
3	21
4	27
Question 7: What is your overall opinion on community events in Abingdon?	

Technical considerations

Central management system (CMS)

- If installing on own server (physical or digital), does the server have the required operating system and additional software necessary to support the specific CMS?
- Is there a Software-as-a-Service (SaaS) option for the CMS?
- What kind of content and media formats does the CMS support (e.g., images, videos, Powerpoint, PDF etc.)?
- Does the CMS offer templates and/or widgets for display layouts or will they need to be designed from scratch?
- Does the CMS offer multiple display zones for the layouts (e.g., zones for clock, map, and events calendar)?
- Does the CMS offer multiple user accounts (e.g., multiple administrators with different levels of access)?
- Does the CMS offer a scheduling function (e.g., advertise a certain event starting from this day until this day)?

Display software

- Does it run on an operating system which is compatible with the display computer (Windows, Linux, Android, iOS)?
- Does it download the content locally to ensure smooth operation during internet outages?

Display computer

- Does it have an operating system installed which is compatible with the display software (Windows, Linux, Android, iOS)?
- Is it powerful enough to display high-resolution graphics and videos (if necessary)?
- Does it have Wi-Fi and/or wired Ethernet capabilities?
- Does it have the required ports to connect with the display monitor (e.g., HDMI, VGA)?
- Does it include a Consumer Electronics Control (CEC) adapter on the HDMI port to offer control of the display monitor (to power ON/OFF)?
- Does it have the required ports for accessories (e.g., USB ports for mouse, keyboard)?

Display monitor

- Does it have the necessary port connectivity to connect to display computer (e.g., HDMI, VGA)?
- Does it support the required running time (e.g., 12 hours/day)?
- Does it support the required wall-mounting system (if necessary)?
- Is it large enough to ensure readability?

Display computer

Name	CPU	GPU	RAM (GB)	Operating System	Internet Connection	Ports	Display Connection	Cost (£)
Azulle Quantum Access	Intel Atom Z3735f	I7 processor	2	Windows 10/ Ubuntu	Wi-Fi	Micro SD, USB, USB 2.0, Micro USB	HDMI Plug-in	73.79
Azulle Quantum Access Plus	Intel Atom x5 Z8300	Intel HD graphics	2/4	Windows 10/ Ubuntu	Wi-Fi/Ethernet	USB 2.0, USB 3.0, Micro SD	HDMI - Plug-in	114.79
Lenovo ideacentre 300	Intel Atom Z3735f	I7 processor	2	Windows 10/ Ubuntu	Wi-Fi	USB, Micro SD, USB 2.0, Micro USB	HDMI - Plug-in	90.19
Intel Compute Stick	Intel Atom Z3735f	I7 processor	2	Windows 10/ Ubuntu	Wi-Fi	USB, Micro SD, USB 2.0, Micro USB	HDMI - Plug-in	79.19
MeegoPad T02	Intel Atom Z3735f	I7 processor	2	Windows 10/ Ubuntu	Wi-Fi	USB, Micro SD, USB 2.0, Micro USB	HDMI Plug-in	73.79
Beelink Z83-II Mini PC*	Intel Atom x5 Z8350	Intel HD Graphics	2	Windows 10/Linux	Wi-Fi/Ethernet	DC, USB 3.0, 2x USB 2.0, SD	Requires HDMI cable	89.90
Raspberry Pi Model B	ARMv8	Videocore IV 3D	1	Raspian	Wi-Fi/Ethernet	4x USB, Micro SD	Requires HDMI cable	31.99
HP Chromebox*	Intel Celeron 2955u	Intel HD Graphics	4	Chrome OS	Wi-Fi/Ethernet	4x USB 3.0, 3-in-1 SD card reader	Requires HDMI cable	130.38
Rikomagic V5	Rockchip RK3288 SOC	Mali T764 3D	2	Android/ Ubuntu	Wi-Fi/Ethernet	2x USB, Micro SD	HDMi Plug-in	79.99
Mvix Xhibit Mykro	Mykro CMS	Xhibit Signage 1080p	N/A	Xhibit Signage	Wi-Fi/Ethernet	3x USB, Micro SD	HDMI cable/ VGA	212.38

Those marked with an asterisk include a Consumer Electronics Control (CEC) to offer control of the display monitor.

Display monitor

Name	Size (inches)	Resolution	Speakers?	Wall mountable?	Port Connectivity	Cost (£)
AOC e2270Swhn	21.5	1920x1080p	No	Yes	HDMI/VGA	79.99
ACER S220HQLBbid	21.5	1920x1080p	No	No	HDMI/VGA/ DVI	79.99
HP Pavilion 24xw	23.8	1920x1080p	No	No	HDMI/VGA	109.97
AOC i2369Vm	23	1920x1080p	Yes	No	HDMI/VGA/ Displayport	129.99
DELL S2415H	23.8	1920x1080p	Yes	Yes	HDMI/VGA	169.99
SAMSUNG S24F356	24	1920x1080p	No	Yes	HDMI/VGA	129.99

Digital signage software

Name	CMS[1] OS	CMS setup	Display OS[2]	Display setup	Media support	Schedule function[3]	Design Templates	Multiple display zones[4]	Multiple user accounts	Cost (£)
Xibo	Win.[5] Linux SaaS[6]	Self None	Win. Linux Android	Self	images videos PPT	Yes	Yes	Yes	Yes	Free 14.4 (per year, per display)
Rise Vision	SaaS	None	Win. Linux	Self Pre-con.[7]	images videos websites	Yes	Yes	Yes	Yes	Free Monthly pkgs
Screenly	Rasp. SaaS	Self None	Rasp.	Self Pre-con.	images videos websites	Yes	No	No	No	Monthly pkgs (per display)
Digital Signage	Win. SaaS	Self None	Win. Linux iOS Android	Self SaaS	images videos	Yes	Yes	Yes	Yes (paid)	Free 730 (per server) 80 (per month)
Concerto	Linux	Self	Win. Linux	Self	images videos PPT	Yes	Yes	Yes	Yes	Free
Yodeck	SaaS	None	Linux	Pre-con.	images videos PPT websites	Yes	No	Yes	Yes	77 (per month, per display) + free hardware
Mvix	SaaS	None	Linux	Pre-con.	images videos	Yes	Yes	Yes	Yes	Free (with paid hardware)
Sedao	SaaS	None	Win.	Self	images videos	Yes	Yes	Yes	Yes	Need quote
Signage Live	SaaS	None	Win.	Self Pre-con.	images videos	Yes	Yes	Yes	Yes	180 (per year, per display)
Digital DM	SaaS	None	Win. iOS Android	Pre-con.	images videos	Yes	Yes	Yes	Yes	Need quote

1. Central management system software
2. Operating system
3. Scheduling certain media at specific times
4. Display split into various zones (map, clock, events etc.)
5. Windows
6. Software-as-a-Service (web-based)
7. Pre-configured display hardware available