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PERSPECTIVES OF SUSTAINABLE DEVELOPMENT GOALS

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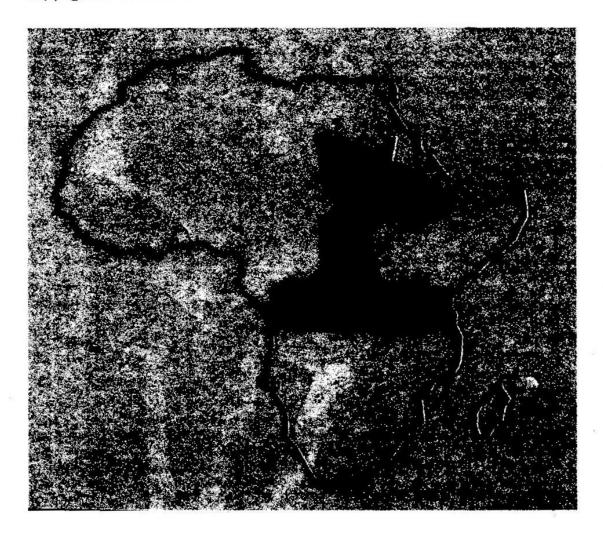Inyang Mbong Udofot
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Digital Signaging for Information Dissemination in Nigerian Libraries: A Vehicle for achieving Sustainable Development Goals (SDGs)

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Abstract

Sustainable Development is a phrase that has gained currency in recent years in its bid to harness the necessary inputs for our idea of an ideal future which is stalled by inadequate medicare, illiteracy, global warming, depletion of earth's natural resources, among others. In Nigeria, scholars and development experts have explored various ways of achieving the 17 point SDGs. One of the unexamined means of achieving sustainability is the use of digital signage systems which are specifically designed to broadcast customised or specific information to teeming end users. The thrust of this paper is couched on the assertion that appropriate deployment of digital signage systems in training, testing, education, enlightenment, research, interactions and collaborations amongst development experts and scholars will open new vistas on how sustainability can be attained. This paper also highlights several opinions to show that all types of libraries if properly harnessed, could serve as a pivot in the anchoring of digital signage systems for patrons' current awareness towards the attainment of Sustainable Development Goals. This paper therefore recommends that since libraries offer information services that promote the acquisition of knowledge, it should be used appropriately in the deployment of digital signage systems for information dissemination and user orientation services in a bid to achieve the 2030 Sustainable Development Goals.

Key words: *Sustainable Development Goals, Information Dissemination, Digital Signage, Libraries*

Introduction

Libraries all over the world have gone through significant changes and different developmental phases in recent years. This change which is necessitated by the advent of ICT has revolutionized information provision in diverse ways like generating, processing and disseminating information. Thus, the traditional methods of information dissemination have given way to electronic means of communication (Emezie & Nwaohiri, 2013). In line with this, Haber (2011) was of the view that while providing books was a standalone function for libraries throughout the last few centuries, their offerings have evolved with the digital age to meet the changing needs of their patrons. This means that libraries, whose primary roles lie in the creation, storage and dissemination of knowledge must provide relevant and timely sources of information to her immediate communities as they embrace this modern technological whirl.

Libraries are therefore compelled to incorporate digital sources in order to remain at the fore of information provision and dissemination (Emezie and Nwaohiri, 2013). In a similar vein, Pradhan & Mohanty (2016) stated that today, academic libraries are struggling

to provide quality services to the users in this emerging era of digital technology which has brought not only changes to methods of information but also its retrieval processes and the accessing of the information. To subscribe to the above assertion, Lombardi (2000) purported that users will prefer more computer contents, more and more computer indices, digitalized finding aids, digital repositories of article, online access to newspapers and other resources. Therefore, library service should cover the acquisition, storage processing and dissemination of information in digital format. Such digital devices include digital signage which should identify users needs and also provide the right information services at the right time in order to save the time of the users. Digital signage is therefore the use of modern flat-panel video devices, typically LCD or Plasma TVs connected to a small computer or network device, to display a wide range of informational and marketing materials using various media formats, including web-based technologies (Morgan and Mori, 2008).

Digital signage is a form of electronic display showing information, advertisement and messages which emerged and became a properly growing field (Khan, Khusro and Jabeen, 2014). Similarly, Wirespring Technologies (2000-2004) is of the view that digital signage is a name given to any number of methods used to display multimedia contents in public venues. The concept of digital signage is not new. It is an in-space and out-space information dissemination device which has the ability to show any type of media on a digital display. The digital signage media are just transformations or replacements of the traditional billboards, paper boards, posters, signboards, banners, blackboards and whiteboards. These traditional displays were hitherto used as a means of communication and information dissemination of community and organisational events, current awareness and felicitations. Therefore, digital signage displays is an alternative to traditional displays which has activated new forms of presentations, interactivity and experiences. It represents an emerging new technology which is rapidly gaining popularity today in the library (Khan, 2009).

The major benefits of digital signage include size and cost reduction, increased flexibility, attraction of users (Khan, Khusro and Jabeen, 2014) for increased patronage. In line with this, McCarthy *et al* (2009) and McDonald *et al* (2008) stated that the cost of digital displays are decreasing public spaces with the fast enhancement in sensors technology which makes these displays run contextual applications benefiting the users of the library. McDonald *et al* further corroborated the above assertion by emphasizing that the usefulness of these systems depends on the content presented in the displays, the place where the display is installed and how these contents are controlled. The content either follows a pre-arranged linear playlist with clearly defined time slots for different content elements, or a dynamic playlist evolving according to many criteria including user (inter-) action (ITU-T Technology Watch Report, 2011).

Digital signage is an invaluable tool that can be used to communicate with library users as they catch attention very easily. It creates a new opportunity to reach your library patrons (Schander, 2013). It serves as an effective marketing and advertising tool with its very engaging visuals for any university library. It advertises library services and events

like library week, new databases, general news highlights or highlights from special collections, upcoming library events, and orientation. Another notable benefit of digital signage is its versatility with a variety of an updated and informative content.

Digital signage displays are of different sizes from mobile to wall mounted (Khan, Khusro and Jabeen, 2014). Whatever the size of signage displays, the authors posited, supports a variety of interaction mechanisms. According to Schmidt and Staadt (2006), large screens could be used in training sessions, testing, educations, research, simulations, interactions and collaboration. Both medium and small size displays are all suitable for information dissemination.

The content reproduced with digital signage can be as diverse as its source and it is typically produced by marketing and sales professionals, professional audiovisual/web advertising agencies and freelancers, based on aggregator services (e.g. RSS feeds or feeds developed by ICT Service Providers) or generated by the user (e.g. by the secretary) (ITU-T Technology Watch Report, 2011). With the upsurge in technology, design and selection of content displayed is a key factor in information dissemination for achieving sustainable development goals. The regular media used in digital signage networks are sound and visuals, though sound is most often considered noise by library users as well as staff members. Noise from audio sources may seem to blur the intended message. As such, the presentation of content requires more bandwidth, more processing power and higher-quality end terminals which can overload the communications infrastructure and limit responsiveness in content delivery (ITU-T Technology Watch Report, 2011).

Information Dissemination Services that could be projected on Digital Signage

Libraries offer library and information services to promote the acquisition of knowledge. This information dissemination services which can be put on display on the digital signage media include:

    i.   **New information dissemination services:** this is information that is current in line with the latest literature published such as new trends and latest developments in a given subject area or information needed to make practical decisions or informed choices, academic and research teams, bibliographic information and analytical information, journal publications, monographs etc. To provide this service, librarians need to compile published and gray literature in all fields to relevant data inputted in the database in order to have produced current titles.

This information dissemination service is made up of two types of services i.e. selection dissemination of information and electronic clip-on services.

    a.   **Selective dissemination of information:** the library can organise this service by providing new or updated information to the users on select topics of their interest from new information sources and trending events, especially as it has to do with Sustainable Development Goals.

    b.   **Electronic clip-on information dissemination service:** this is a process where librarians offer electronic clip-on services to library users based on

the topic which the users have so chosen. Library users need to register in the university library with their names and profile information updated in the system in order to benefit from this service. With this, they promptly receive feedback in their mail boxes. This information dissemination service is a modern technological, method of disseminating information which was hitherto done through current awareness and SDI services can still be carried out through the electronic.

ii. **Routine information dissemination service:** this service is provided on a day-to-day basis and includes the result of experiments carried out, research on engineering operations in a factory, details of fabricated products etc. Routine information dissemination service can be given through directories, handbooks, encyclopedias etc.

iii. **Simple-phrase information dissemination service:** in the simple-phrase information dissemination service, complete picture on a particular topic is re-display based on the users' query. This will enable the user understand the developments in the topic which he must have lost touch with.

iv. **Complete information dissemination service:** this involves information for highlighting, assessing and understanding general trends in the subject. This service is accomplished through information sources which are mounted on display include; literature search, bibliographic compilations, reports, and critical reviews based on the library users' topic of interest, subject or area of specialization. Such information dissemination service could be given on demand, as coverage is usually complete

Approaches to Digital Signage for Improved Information Dissemination in Libraries

There are three different ranges of content in digital signage displays as explicated by Khan (2009) thus:

a. Stand-alone digital signage display

It is very simple as it consists of a display and a computer that is not connected to a network. The contents of the digital display(s) will be controlled by this computer. New display contents can be installed using a USB memory stick or other portable storage devices. A simple stand-alone digital signage might only display a single fixed display of content or it might change different parts of the display based upon a static schedule.

Advantages

- Deployment is easy and simple.
- Cost effective. No cost for network connectivity.
- Can be managed and controlled by employer or user.

Disadvantages

- Provides only display of semi-static contents (i.e., when the contents are loaded- the contents are fixed until someone physically comes to the computer and loads new

contents). However, as noted above the contents could be displayed in a time dependent manner.

- The lack of network connectivity limits the information that can be provided to be displayed to semi-static contents that are known when the contents are written to the storage device for later loading into the computer.
- Cannot be used to deliver information that changes (in an unpredictable way) faster than the time between loading new content into the computer.

b. Web-base digital signage

In this type of digital signage, the contents of the signage/display can be directly controlled by a local web browser. All the contents on the display(s) can be easily controlled by us/administrators from anywhere on the network that is able to reach this device either directly or by proxy.

Advantages

- No server architecture is required.
- All of the content management can be done via a web browser from a network attached computer.
- It is a scalable solution, since the rendering of the content is done locally - allowing each sign to display information specific to this display.
- Can support different accounts with different access – enabling different types of users and administrators to have different rights with respect to controlling the device and the contents that are displayed.
- Simple and easy deployment with remote access from any browser.
  Cost effective. No need for expensive software or hardware (aside from the cost of the digital sign, associated computer, network connectivity, and electricity).

Disadvantages

- Preferred by small organizations.
- May need high bandwidth, between the computer and the display, but only if full motion video and advanced graphics are desired.

c. IPTV-Based approach

In this approach, all of the contents are distributed by a streaming IPTV media server. The contents such as video, graphics, animations, images files, and web contents are directly distributed from a central media server to media players attached to network displays. A central network manager handles the task of organising, managing and distributing content to a media player connected to each display. This approach is very suitable for a large number of displays that will display only a limited number of different streams of content. This approach could be viewed as a closed IPTV service, where different displays can select different IPTV "channels".

Advantages

- SRTP or other techniques can be used to secure the content and provider data integrity.
- Due to the commercial use of IPTV, IPTV services can be highly stable and have high available.
- Provide advanced feature such as unlimited channel capacity (unlike analog TV based distribution which offers only a finite number of channels of capacity).

Disadvantages
- Large and complex network infrastructure i.e requires installation of servers, deployment of media players, and management of media services.
- This type of solution is based on PCs, servers, and media players. Some of these hardware components may be relatively inexpensive (for example, media players), while other components can be more expensive (such as media services to support a large number of different media streams).
- Training and integration with databases may be needed.
- Needs high bandwidth between the media service and the media players
- If a central server fails, then all the system is unavailable.

Rationale for Adopting Digital Signage for Information Dissemination in Libraries for the Attainment of the SDGs

Digital signage systems are now becoming essential components needed in libraries. Libraries are therefore learning spaces where users are not only expected to consume information alone but are expected to utilise the knowledge gained to actualise their dreams and what is expected of them by the society (as is clearly indicated in the Sustainable Development Goals). Digital signage could therefore be used to information about the library and attract library patrons through its peppy content and eye catching designs and animations, web contents, and real-time video broadcasts to showcase ways to eradicate poverty and hunger, enhance good health and all-round well being, provide quality education, engender gender equality, provide clean water and sanitation, clean energy, good jobs and economic growth, industry, innovation and infrastructure. It could also put on display ways to reduce inequalities, enhance sustainable cities as well responsible consumption, protect the planet, life below water, life on land, provide peace and justice and sustained partnership for all the Sustainable Development Goals as listed.

It employs a wide-ranging solution which allows for a dependable centralised management and publishing of digital media in order to attract more users to patronise the library. By so doing, it becomes an effective tool that is needed to communicate with users (as conventional signs, static signs, posters and flyers only encourage manual distribution and installation) and reduces cost of producing and installing a new sign each time a different content have to be replaced.

Digital signs provide useful information (for safety, disaster management, direction, identification, behaviour regulation, current awareness etc) to library patrons about events in and outside of the library. It can also be continually updated and refreshed to advertise events and offer news feed on all international and state events.

Delivering content over the internet ensures its safe arrival, proper scheduling and handling which eliminates independence on in-library personnel to change tapes or DVDs (since library personnel are not employed to perform such tasks or not usually motivated to perform such tasks) as the content in such tapes are found in collections associated with management and support functions.

Digital signage has several additional components over traditional displays with expensive physical duplication of materials or the burden of sojourning to a place where such materials are displayed. It also stores large volumes of already achieved digital information which facilitates library users' rapid search and access to a multiplicity of multimedia information in an interactive mode.

Challenges associated with Utilising Digital Signage for Information Dissemination

The greatest challenge in the deployment of a digital signage system in a library for information dissemination is not technological but content creation and management Morgan & Mori (2018). Therefore, SandKRS (2014) categorizes challenges of digital signage to include the following:

i. Display blindness – public displays are used in many places most of them not getting the attention of the users due to static public screens.

ii. Content selection for displays – content selection generically addressed by the recommender system, recommends new items based on preferences or properties of a profile of user or the place which has issues of creating place profile and selection of relevant sources from collected that may limit the use and application of the existing recommender system.

iii. Interaction in the public spaces – interaction in public spaces depends on the personality typologies of library users. Timid users shy away from interacting with the display while extroverts always seize an opportunity to interact with the display. It all depends on the privacy of users' or staff personal or personnel data which must be addressed in public spaces for increased utilisation of academic libraries.

iv. Scheduling of contents and application – the current display systems show contents which are scheduled in advance but with the emergence of open display networks and content adaptive systems, these approaches have limitation with context awareness, interaction and new scheduling approaches are required.

Budgeting constraints must also be taken into account when discussing the challenges associated with the utilization of digital signage for information dissemination in academic libraries in Nigeria. Morgan & Mori (2008) also added that the greatest challenge in the deployment of a digital signage system in a library is not technological but content and management. The authors further stated that content must be appropriate, attractive, engaging and above all continually refreshed as content shown over and over will eventually fade into the background.

Strategies for enhancing Information Dissemination in Libraries through digital signage for Sustainable Development

In order to serve patrons better, academic libraries should re-address the issue of digital signage so as to make the library environment pleasant and comfortable. Therefore, librarians must set goals on what they want to accomplish as they design and implement a signage project. These goals must accommodate the type of display to use, the media, the location (in the library or the type) and the content needed (which must be based on the location). To enliven content so as to make it more appropriate, appealing, absorbing and refreshing for library patrons, Morgan and Mori (2008) stated that several sectors can be employed as content creators in order to contend replication of content and the eventual vanishing of content into the background. The authors further enumerated several ways every member of the university community can actually become content creators so as to justify the adoption of digital signage for information dissemination in libraries thus; reference librarians contribute news of various teaching events; of new resources in the collection; Special Collections staff highlight new collections or historical images; students contribute special event posters; university staff advertise services such as tutoring or computer training, and the athletics department send game information.

The next step is the identification of beneficiaries. This will take into cognizance the fact that the beneficiaries of university libraries are students, faculty members and the generality of staff in the university community. The identification of beneficiaries will take into consideration, library users – their motivations and interests. This will help attract their attention by presenting well targeted digital signage.

The third step involves carrying out personnel and facilities check thus:

i. Get a project manager who will be vested with the responsibility of updating and managing the digital signage.

ii. Get a media player to power the display and allow content to be shown on the digital signage.

iii. Display: This is a screen that will show content like that of a TV and monitor.

iv. Get a Content Management Software which will be used to create content and schedule it to be displayed.

The fourth step has to do with choosing the location for display i.e. the right placement for the display. The location should take into cognizance the beneficiaries (i.e. the library users) and the content for dissemination. Digital signage should therefore be placed at a high traffic location in the library to make it conspicuous and irritable for library users. For cases of interactive displays, it should be placed where users can stop by and utilise it and should be elevated to a height which can be seen easily at an eye level and well-lit for night time identification. According to ITU-T Technology Watch Report (2011), digital signage can be received from one or three viewing patterns namely Point of Transit, Point of Wait or Point of Sale and their content must be designed to complement their viewing pattern thus:

• **Point of Transit:** Kelsen (2010) describes this as consumers are on-the-go-viewers. These are signs positioned in high traffic areas for people moving to and fro in a

library space. This viewing pattern will likely be seen at a glance. It can however be seen at a glance but users' interaction with the display will be short. Short concise but legible messages are suitable for this display and it is best for event announcements, daily reminders, call to action, emergency communication and mass notification, national disaster warnings etc.

- **Point of Wait:** this interaction generally occurs in lobbies, elevators, service desks and any waiting areas in the library. As such, viewing times are longer with longer messages and heavier content. It is suitable for informative content and news, engaging content (video, spotlight stones etc) that may decrease perceived wait times.

Like time and place of upcoming meetings, financial and weather updates or simply content designed to create a pleasant ambience. This viewing pattern is very ideal for interactive displays as library users interact with it for a longer period of time. With this, users can explore way finding maps, searchable directories, scrollable pages etc.

- **Point of Sale:** this is generally being viewed for longer periods of time and is to help people make a buying decision. In library cafeteria or canteen. It is suitable for brand awareness, menu advertising new products, service hours, discounts or sales etc.

The fifth step involves employing sign elements which must be consistent in their bid to impact positively on the library user's way finding and utilization process (Beneicke, Biesek and Brandon, 2003). The authors stated further these elements of signs which both subtle and obviously convey a wide variety of meaning and messages which users need as the journey through the world of the library. Such elements include graphic design, message style, implementation, fabrication and personnel which are contained in the schematic design phase.

The sixth step has to do with adhering strictly to certain signage design principles like layout, specifically lettering, simplicity, colour, shape, size and design.

Conclusion

This paper has been able to assert that Digital Signage Systems have become a veritable tool in massive information dissemination and orientation services because it avails very vital information for safety, disaster management, inequality, inadequate Medicare, illiteracy, global warming depletion of earth's resources among others which are necessary input towards the attainment of SDGs. To this end, the paper believes that if libraries are properly equipped with appropriate digital signage tools, this will go a long way in its task of training, testing, enlightenment, research and collaboration amongst stakeholders. This in turn will ultimately open fresh avenues towards the realisation of Sustainable Development Goals.

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