

# Analog Broadcasting Transmission in The Digital Age: Development of Community Radio Management Model “Suara Edukasi Kulon Progo”

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**Abstract**— The existence of a blank spot area for internet signals and economic limitations are obstacles to the online learning process as happened in the Kokap sub-district, Kulon Progo, DIY. Community radio offers a solution, but problems related to managerial constraints and the quality of human resources become problems in its management. Therefore, a suitable management model is needed to be applied in accordance with the 3 pillars of broadcast media. Research and development has been carried out and resulted in 3 community radio management models that have been piloted, namely, an integrated content production collaboration model that is able to streamline costs, a programming model with high accessibility that can be used effectively for live broadcasts and scheduled taping broadcasts with mobile controlling, as well as a simple broadcasting technique model that can bridge the digital content production system with an analog broadcasting system so that students can study in the air using analog radio equipment, FM Radio applications installed on smartphones and web streaming. Meanwhile, the marketing aspect runs organically because the supply is based on the needs of its users. The conclusion of this study is that the Suara Edukasi Kulon Progo radio management model developed is useful for running community radio effectively, efficiently and sustainably.

**Keywords**—*broadcasting, community radio, content, management, programming*

## I. INTRODUCTION

In the digital era, the communication process seems easier to establish. The development of information and communication technology has been able to mediate communicators and communicants in exchanging messages interactively. However, it should be understood that the technical prerequisite that must be met for the smooth communication process is the equivalence of media technology that can be used by communicators and communicants. Basically, the types of communication media technology are divided into 2, namely analog media and digital media. Both have different characteristics, as well as advantages and disadvantages. Analog technology tends to be easy to use and low-cost, but quite complicated to produce content. Meanwhile, digital technology offers a lot of convenience in the use and production of its content, but

requires the readiness of infrastructure and networks that support the broadcast.

At first, advances in information and communication technology have changed the way of learning. The importance of knowledge related to the principles of digital media to develop concepts and functions of effective communication in the digital space, especially for students. In the learning process, this means they understand the conceptual and functional skills to communicate effectively in the digital space [1]. However, due to the pandemic conditions, students are forced to be ready to understand the characteristics of communication in online study rooms. So far, the new media (internet) is still the mainstay in the implementation of distance learning.

Since the outbreak of the Covid-19 pandemic in Indonesia, the government has closed schools and enforced a policy of learning from home through distance learning. The teaching and learning process is run with an online system using electronic communication media. Digital communication media support learning in most areas. A year has passed and an evaluation has been carried out so that the obstacles faced by each region are mapped. Muhammadiyah University of Yogyakarta as a higher education institution is engaged in offering solutions to the problems of implementing learning in primary and secondary education in this post-pandemic period.

The existence of a blank spot area for internet signals and economic limitations are obstacles to the online learning process, as happened in the Kokap sub-district, Kulon Progo, DIY. For this reason, LP3M UMY initiated a thematic KKN program to revive community radio which had been in hiatus for a long time. The researcher acts as the person in charge of the Suara Edukasi Kulon Progo community radio program and broadcasting. His job is to create a management model and a training facilitator in implementing the resulting model. Ease of Use

## II. LITERATURE REVIEW

Radio is one of the electronic aural broadcasting media that can efficiently reach many listeners at one time. Furthermore, it is explained that a nation as an imagined

community is a reflection of members who share common ideas in their association, even though they have never met other members [2]. Community radio emerges from association members who are connected to each other through a broadcast media even though sometimes they have never met face to face before. One of the characteristics of community broadcasting media is that it must be able to provide solutions to problems faced by residents [3], namely the need for online learning facilities in the blank spot area. Education units from kindergarten, elementary, and junior high schools under the Muhammadiyah affiliate agreed to share ideas about learning from home through the Suara Edukasi Kulon Progo community radio with the slogan "learning in the air".

Community members work together on the creation and use of learning content. The support of community members gives impetus to the survival of a community radio [4]. The survival and sustainability of community broadcasting is a homework that is no less difficult than its establishment. The needs and potentials of the community are the main capital in the survival of community media. But on the other hand, problems related to managerial constraints and the quality of human resources are a problem in the management of community radio [5]. For this reason, a community radio management model is needed that can optimize the potential of its members to solve the problems they face.

Learning programs are commodities produced by educational broadcast media. One of the influences on the quantity and quality of the content produced is the ability of the management resources [6]. The immediacy value of community radio content has great power to reach listeners [7]. Content created by and intended for its members is an optimization of its function. In line with this, the frequency and duration of hearing are factors that affect the level of fulfillment of listeners' needs [8]. The preparation of the program should be adjusted to the learning hours of each level of education. Technical aspects and creativity in programming must be in accordance with the needs of the listeners [9] in order to be able to bind listeners well. Furthermore, the positioning of community radio must be strong for its sustainability [10]. The positioning of Suara Edukasi Kulon Progo radio as a means of online learning must be maintained through the preparation of its program.

Based on the above background, preliminary research has been conducted to identify potential abilities and problems. The availability of infrastructure and digital networks in each school is the main capital in content production. Furthermore, the analog broadcasting technique that can be received by radio listeners through FM frequencies is a gap that must be balanced. Therefore, a structured community radio management model is needed and collaborates with every existing element effectively and efficiently.

### III. METHOD

The success of the radio community as a broadcaster is supported by three pillars of broadcast media, namely technique, program and marketing. This research and development uses the research method described by Sugiyono [11], namely research and development (R&D) in producing products and testing their effectiveness. The stages of the research carried out are:

- The mapping of potential capabilities and problems has been carried out as a preliminary study.
- Making a management design that includes 3 models, namely a content production model, a programming model, and a broadcasting technique model.
- Design validation and revision were carried out prior to the premiere.
- A limited trial has been conducted through the inaugural broadcast of Suara Edukasi Kulon Progo radio on February 16, 2021.

### IV. RESULT AND DISCUSSION

This research and development has resulted in a management model that is implemented to manage the Suara Edukasi Kulon Progo community radio, namely:

#### A. *Collaboration Model in Integrated Content Production.*

This collaborative content production management model is run by educational units of community members and integrated in one network. Content is produced and integrated digitally so that it is easy to manage. The collaboration model that was initiated involves a central studio and contributor studio. Central studio refers to a studio that is equipped with analog transmitter equipment in the form of transmitters and antennas. While the contributor studio is a production studio with a digital system that is placed in each school. The schools that are part of this community radio have prepared themselves by building mini studios equipped with content production equipment. The minimum standard of equipment used is a computer audio recorder and microphone. Learning content is packaged in an interesting and varied manner according to the character of the students.

Management includes the process of planning, organizing, directing and controlling. Activities carried out starting from production design to content distribution need to be well prepared so that collaboration can be established easily, comfortably and sustainably. Content production stages include pre-production, production, and post-production stages. Each school has a person in charge of content production who is commonly referred to as a producer in the structure of the broadcasting organization. The role of the program producer is important to maintain the quality of the content produced. The following is the organization of work carried out at each stage. 1) Pre-production. Room for a mini studio and equipment is set up for producing podcasts. Prior to recording the content, a taping material preparation meeting is held which is attended by producers and broadcasters. Broadcast script creation by broadcasters. Preparation of broadcast fillers if it involves parties other than broadcasters, such as students and experts. Producer to appoint a recording schedule involving operators, broadcasters, and guest stars. 2) Production. Recording of learning content is carried out by involving producers, operators, broadcasters, and experts. 3) Post-production. If needed, the editing process is enabled to finalize the recording of learning content and the editing process is carried out by the operator. Creating content packages based on education level and learning subjects that are ready to be arranged in a broadcast schedule.

Storage and distribution of broadcast content by uploading on Spotify and Google Drive. Collaborating content in audio file formats from multiple contributors requires platforms and the cloud to be easily accessible. Each school already has a Spotify account to upload their productions so that all the content produced is integrated in one platform. Thus, programmers will more easily manage content packages into program playlists. Simultaneously, this model allows learning content to be accessed on demand through each school's Spotify account. Meanwhile, non-public content is stored in each school's Google Drive and can only be accessed by the central studio operator.

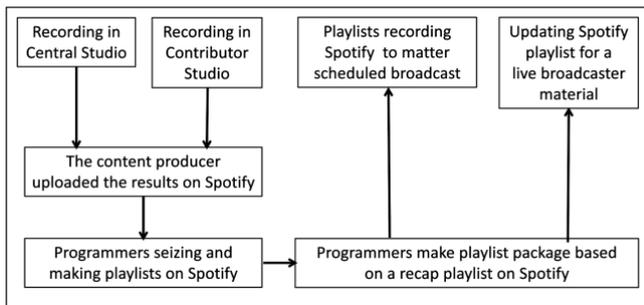


Fig. 1. The collaboration model in integrated content production

The content production model is run collaboratively through a digital platform that is able to make broadcast material well archived and easy to broadcast through a central studio. The advantage of this model is that it is cost-effective. The production burden can be shared by the school community members so that the community spirit is clearly visible. Furthermore, the sustainability of content production will be maintained in order to complement each other's learning needs.

**B. High Accessibility Programming Model**

The broadcast system of this community radio is divided into 2, namely:

**1) Live broadcast**

In this system, broadcasters deliver messages in real time to their listeners. They took advantage of the content that had been compiled on Spotify or Google Drive for the broadcasting minister at that time. Live broadcasts can be run from the central studio and the contributor's studio. This is done to decentralize broadcasting activities in order to streamline the mobility of broadcasters. Remembering that publishers are teachers who have responsibilities and jobs in their schools.

- Live broadcast from the central studio is run like conventional radio broadcasts, where the broadcaster is present there. Listeners can engage online through communication media such as WhatsApp and Zoom. The central studio located at SD Penggung is equipped with computer equipment with the Winamp Audio Streaming application and the Azuracast application as an internet radio server. In addition, a digital audio mixer functions to process sound from microphones and other audio materials. The specifications of the tool can produce sound output in digital and analog formats. Analog live broadcast is done by connecting the mixer output to the

transmitter. As for live streaming, digital sound output is connected to live streaming software. And can be accessed by listeners via web addresses or public links with internet radio systems.



Fig. 2. Left: live broadcast from the central studio, right: live broadcast from contributor studio

- Live broadcasts from contributor studios are run from a mini studio in the school and transmitted digitally to the central studio for analogue transmission. Experiments have been carried out in the studio of the contributors of SMP 1 Kokap.

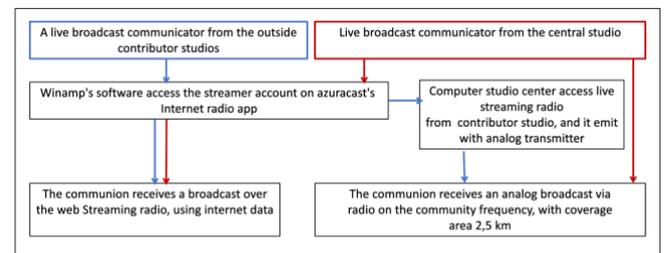


Fig. 3. high accessibility programming model

**2) Scheduled Taping Broadcast**

In this broadcast system, program packages are arranged according to certain classifications and programmed automatically or known as Auto DJ. Programmer is the person who is responsible for arranging programs in the radio station, both live and scheduled. Scheduled broadcast programs are created by programmers from content that has been stored and integrated in Spotify and Google Drive. Other broadcast materials may also be added, such as public service advertisements, jingles and music.

To run this scheduled broadcast, all broadcast material must be uploaded via AzuraCast, an internet radio application. After that, they are arranged in a playlist with various types according to their needs. This internet radio application allows programmers to design weekly or even monthly programs.

The broadcast will take place automatically according to the type of setting selected. The following are the types of scheduling, namely: a) General Rotation : Random playback of content when there is no activity in the studio and there is no schedule whatsoever in the app. This makes radio never give up its broadcast content. This setting is suitable for playing music. b) Once per x Songs : Playback of content according to the planned frequency. For example, for the purpose of playing jingle material automatically after round 2 of learning content. c) Once per x Minutes : Broadcast content is played according to the frequency of content based on duration per minute. For example, for the purpose of playing the station ID every 15 minutes. d) Once per Hour : Content plays according to the frequency of content packages based on hourly duration. For example, for the

purpose of playing ads every hour. e) Advanced : Playback of content packages that are arranged in full according to the design schedule. This setting is used to schedule programs over a long period of time. Broadcast material will rotate on the scheduled date, day, hour and minute automatically.

For this reason, basic technical workshops are needed by programmers to be able to arrange schedules neatly so that content packages are not cut and clashed. In addition, it can also create playlists according to student study schedules. Using the AzuraCast app allows live broadcasts and scheduled recordings to be operated from anywhere. The programming model that is easy to access from anywhere has provided a solution to the limitations of community radio managers. So that the broadcast can continue to run effectively without the problem of lack of resources to operate it. The admin in charge can operate the application without being bound by space and time as long as there is an internet connection, this means the programming model has high accessibility.

C. Simple Broadcasting Technique Model

Engineering is the main broadcasting pillar related to the availability of equipment. The equipment management model aims to streamline broadcast sustainability and streamline human resource requirements. The convergence of technology is used by connecting internet-based digital recording equipment to frequency-based analog broadcasting equipment. The digital content production system has made it easier to manage. But on the other hand, the gap with analog broadcasting systems is open and requires bridges to connect them. There are 3 broadcasting systems that have been run by Suara Edukasi Kulon Progo community radio, namely analog broadcasting using radio frequencies, digital broadcasting via internet streaming, and merging digital and analog broadcasting.

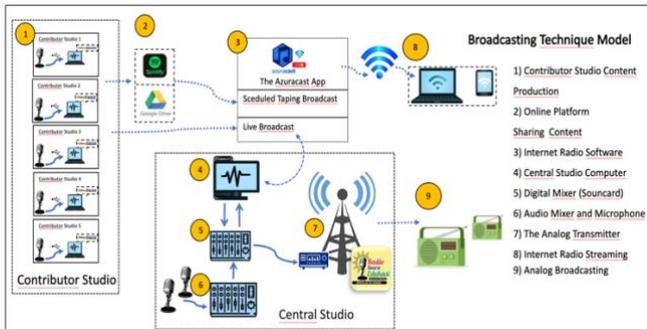


Fig. 4. Broadcasting Technique Model

The three broadcasting systems are designed to be accessible via analog radio frequency waves, web streaming, and smartphones. Analog broadcasting devices are installed in the central studio at SD Penggung. The location was chosen by considering the location in the middle of the blank spot area so that the broadcast coverage radius of two and a half kilometers can cover the entire Kokap sub-district. The analog transmitter antenna broadcasts learning broadcasts through a special frequency provided by the government for community radio, namely frequency 107.7 FM. Meanwhile, the use of digital broadcasting equipment makes educational broadcasts accessible globally via web streaming using internet data. Listeners can also access broadcasts using

smartphones equipped with the FM Radio application easily and conveniently.

Although community radio has sociological and juridical limitations, current technological developments have been able to overcome these shortcomings. Information and communication technology has developed rapidly and is able to synergize community broadcasting so that it can be enjoyed more widely. Technological convergence is seen through the combination of frequency-based broadcasting technology with internet-based broadcasting technology. The following are the minimum specifications of the equipment used

1) Central Studio

The studio which functions as a transmitter station is equipped with hardware in the form of 1 computer unit with specifications for the Lenovo brand, Core i5, 8GB RAM, 1TB HDD. 1 unit Maonocaster AM200 digital mixer that functions to convert analog sound material to digital. 3 units of Maono AU-A04 condenser microphone which serves to capture the voices of broadcasters and performers. 1 unit of Yamaha 4 channel MG10xu audio mixer which is used to process the captured sound from the microphone. 1 transmitter unit with a range of 2.5 km to transmit analogue broadcasts. For live streaming software using Winamp. The broadcast programming system uses the Azuracast application. 20 Mbps internet network connection to run analog and digital broadcast systems.

2) Contributor Studio

A mini studio built in a school room that is used to produce content and live broadcasts. The equipment needed is the same as the central studio except the transmitter. Contributing studios can only stream broadcasts. The AzuraCast app allows broadcasting from anywhere.

3) Content Integration.

Google Drive is used as the Cloud and Spotify is used as an online Platform for storage as well as a means of sharing and managing shared content. The central studio and the contributor studio have their own accounts and can share content with each other.

Equipment cannot work without human resources to operate it. The organizational structure of community radio management should be made on the basis of functional requirements. So far, the appointment of managers is still based on the positions of broadcasting organizations in general, not yet adjusted to the characteristics of educational community radio. This development research cannot change the structure that has been set by the Majelis Dikdasmen Muhammadiyah Kulon Progo. Recommendations that can be given are the inclusion of content contributors in each school in the management structure. Content is the main broadcast material for community radio aimed at learning. This has the same function as the news section for broadcast media that focuses on information.

After an official limited trial, broadcasts continued on a regular basis. Some of the obstacles found were insufficient electrical power in the central studio, unstable internet network, and lack of professionalism of the managers. So that there is an opportunity for those who will contribute to advancing this community radio.

## V. CONCLUSION

The Suara Edukasi Kulon Progo community radio has been used as a solution to the problem of limited online learning facilities for students in the blank spot area in Yogyakarta. During the COVID-19 pandemic in Indonesia, students studied in the air. The following are the conclusions of the research and development that has been carried out:

- Integrated content production collaboration model. Collaboration between educational units of community members in producing integrated learning content is a solution to limited funding. Efficiency in providing easy and inexpensive learning content both from the production and consumption side. The availability of interesting and varied online learning content that can be used together.
- Programming Model with High Accessibility Digital programming is able to save the resources needed in the operation of community radio. Effective in solving the problem of lack of human resources.
- Simple broadcast engineering model using easy-to-operate equipment. This convenience is the key to the sustainability of community radio broadcasting activities.
- Community radio marketing will run organically because of student listeners who want to learn to use radio facilities. Program promos are delivered through student study schedules. The content that is broadcast is the material needed by the listeners. The determined positioning is community radio with educational content. The broadcast program is functioned as a learning tool for students according to their study schedule.
- Further support is needed to upgrade existing infrastructure and networks.
- Consistency in the production of interesting content and according to learning targets must be well controlled.
- Improving the professionalism of the managers is needed through training and mentoring from community media professionals as well as comparative studies to similar, more successful media.
- Furthermore, audience research is needed for further development.

Finally, the management models that have been developed can be used to manage community radio effectively, efficiently and sustainably. And it is hoped that the management model of Suara Edukasi Kulon Progo community radio can be a role model for regions that have similar problems.

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