DIGITAL DIVIDE AND EMERGENCY REMOTE EDUCATION: RECONSIDERING THE USE OF EDUCATIONAL RADIO DURING THE PANDEMIC

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ABSTRACT

In this article, the concepts of interaction and digital divide in emergency remote education practices implemented due to the Covid-19 global pandemic are discussed, and the increasing importance of radio as a traditional mass communication tool in bridging the digital divide and structuring an interactive learning process is emphasized. In this article, the concepts of interaction and digital divide in emergency remote education practices implemented due to the Covid-19 global pandemic are discussed, and the increasing importance of radio as a traditional mass communication tool in bridging the digital divide and structuring an interactive learning process is emphasized. In this exploratory study, the main aim is to see the usefulness of university radio for education during the pandemic process by looking at the experiences gained during the Covid 19 pandemic period. The study examines the program preferences of the participants and reveals better program schedules and program types/themes that will be useful during the emergency education period. When the radio listening habits of Eskisehir Technical University students and academics are evaluated within the scope of emergency distance education applications, it is seen that radio broadcasts can be used as a powerful tool against the digital divide. Research findings show that there is a significant

relationship between academic and students' radio listening time. The factor analysis showed also revealed different factor groups for academics and students. Within the framework of radio program types, six basic factors were determined for both groups. When the learner-instructor interaction is evaluated within the framework of both broadcast times and broadcast types, it is understood that the two-way interaction process can be structured within this framework. The abstract should be about 150-200 words. The abstracts of the research papers should include the purpose, methodology, and results while the abstracts of theoretical papers should provide the general framework, special contributions to the literature, and major conclusions. The abstract should not contain any undefined abbreviations or unspecified references.

Keywords: Covid-19 pandemic, digital divide, educational radio, emergency remote education.

INTRODUCTION

The Covid-19 pandemic process, which started in December 2019 in Wuhan, China and has been affecting the whole world. The mandatory practices and policies implemented during covid-19, and the social life because of covid-19 that people left out, revealed that the covid 19 pandemic process shouldn't be only considered as a health issue. One of the social environments in which the detachments due to social isolation and abstraction are experienced deeply during the pandemic period came from the education sector and its components. Due to the closures of educational institutions and the suspensions of face-to-face education, the education and training process of 1.6 billion students, which corresponds to half of the student population from all education levels, was heavily interrupted. (UNESCO, 2020a; UNICEF, 2020) The number of students who were affected by the interruption of education has reached up to 25 million students across Turkiye. Among the 25 million students, the total number of students at all levels of education, 7,198,987 belong to higher education (UNESCO, 2020b).

To compensate for the interruption of education due to the pandemic, since education is a fundamental human right, emergency remote education (ERE) practices were quickly started for implementation all over the world by many educational institutions (Bozkurt, 2020; 114).

While the emergency remote education practices are implemented two main concepts are noteworthy: The first one is the concept of interaction, and the other one is the concept of digital divide, which negatively shapes the process for learners as well as teachers.

EMERGENCY REMOTE EDUCATION IN THE CONTEXT OF INTERACTION AND DIGITAL DIVIDE

Remote education is a method that includes learning forms presented electronically in environments such as multimedia, interactive media, hyperlink, rich media environment, as well as applications and models that occur simultaneously and asynchronously. (Yamamoto & Altun, 2020; 31) Within the education system that switched to the emergency remote education model due to the Covid-19 pandemic, for learners who find themselves in an online classroom environment in remote education after being used to face-to-face interaction ensured by the traditional classroom environment, the sense of community that decreases as a result of physical distance brings with it the feeling of not belonging to the community and the feeling of exclusion which can result in students leaving the programme. (Ilgaz & Askar, 2009; 28) Interaction is an essential factor that supports both the community building and the learning process. (Ilgaz & Askar, 2009; 29) Researchers who have been carrying out studies on the perception of remote education state that, for effective learning, the basic thoughts about the course content and the willingness and aptitude to personal observation for the comprehension of the content, as well as the student's perception of the effectiveness of social interaction, affect the learning outcomes. (Ibicioglu & Antalyali, 2005; 327) As the physical distance and asynchronous education process in remote education may cause the student to feel that he/she does not belong to an educational community and to feel excluded, this may result in the student leaving the programme. (Ilgaz & Askar, 2009, 28)

In a study conducted on remote education by Kaysi and Aydemir; it is stated that, in remote education, in addition to the interactions between the learners or with the instructor of the course, other types of interaction are also weak, and that interaction is an essential component in the formation of attention and motivation towards the lesson. (Kaysi & Aydemir, 2017; 786) Afsar and Buyukdogan, in their study that included the evaluations of students on remote education during the pandemic process, emphasized that the students stated that their communication with the lecturer in remote education became difficult and that the lack of in-class interaction negatively affected their education. (Afsar & Buyukdogan, 2020; 177-178) In a different study, it is emphasized that when learners and/or instructors accustomed to face-to-face education and learning methods are not competent in the use of technology, the remote education process becomes challenging and issues such as inefficiency arise due to deficiencies such as infrastructure etc. in the channels that offer remote education. (Yamamoto & Altun, 2020; 31) In order for the remote education process to result in effective learning/teaching and achieving successful results, it is understood that there is a need for interaction between the student and the teacher and between the student and the course materials. Therefore, it would be fair to emphasize that the use of communication technologies that will provide interaction is important to achieve successful results in remote education.

In a study conducted by Altuntas et al.(2020), on the level of perception of university students regarding their learning experiences in the remote education system implemented during the pandemic process; the fact that the hypothesis measuring the social factor could not be confirmed showed that the remote education process did not have any contribution on the relationship between students. Based on this result, the authors of the study emphasized that to ensure institutional belonging and motivation in the pandemic process in universities, internal communication should be structured in the most correct way with the students as well as academic and administrative staff, and communication channels that will protect the institutional image should be used. (Altuntas et al., 2020; 21-22) As the result of the developing technologies to be used in remote education, it is thought that learners will have many opportunities such as self-directed learning, learning at their own pace, accessing information at the desired place and time, and establishing stronger communication between individuals involved in the education process. (Gokmen et al., 2016; 42)

It seems essential for the successful management of remote education, which has become a requirement in higher education due to the Covid19 pandemic that communication technologies are used and that the method and application contain interaction in terms of providing motivation and belonging.

Within the framework of the two-way communication model of remote education, there is a system in which students and teachers communicate with each other with audio or video calls in environments where learning and teaching activities take place. (Arat & Bakan, 2011; 367-368) Two-way communication models used in remote education are classified under four headings. It is possible to classify these as two-way radio, two-way teleconferences, two-way interactive computer, and two-way mixed application models. (Cam, Gunduz & Isman, 2011; 628) Two Way Radio Application Model is ensured by offering remote education-teaching services to students in different regions by having audio conferences via radio and radio broadcasting is established in such a way that there is communication and interaction between teacher-student and student-student. (Cam, Gunduz & Isman, 2011; 628) In this model, the student can immediately ask the teacher about the subjects that he/she does not understand about the lesson and the teacher can immediately answer the question asked out loud, and the motivation of the student can be kept high as he/she can get immediate feedback. (Cam, Gunduz & Isman, 2011; 628) In this model with two-way voice communication, remote education can be offered to students at a low cost, and it can also cause permanent behavioural changes in students as the result of the mutual interaction provided. (Cam, Gunduz & Isman, 2011; 628)

It is considered essential for universities to use technologies that will provide two-way communication to strengthen the institutional belonging of universities to students and academicians and for the remote education process to produce successful results. It is inevitable for universities to attach importance to investments in technological infrastructure while determining the methods and models to be used in remote education applications, which have become mandatory during the pandemic process and are expected to continue, and the use of radio, TV, and internet-based communication channels in remote education in such a way to allow two-way interaction. Considering that the infrastructure, equipment, and installation costs of such technologies might be challenging for the budget of universities, radio can be used as the technological communication tool that will increase the two-way interaction in remote education, strengthen institutional

belonging and can be implemented quickly. When compared to other mass media, it will be fair to say that radio is more affordable in terms of installation and operation, which provides convenience and is preferable in this sense.

Another essential concept that determines the success of process as much as interaction is the digital divide. "Digital divide", in general terms, is about the differences in access to new digital technology, and variations in access to shared information in locally and globally distributed digital communication channels. Regarding the concept of digital divide, concepts such as digital inequality, digital division, digital differences, digital gap, digital separation, and digital detachment are used (Atilgan, 2003; Ozturk, 2005; Sen & Akdeniz, 2012; Yildiz & Seferoglu, 2012; Kalayci, 2013). In English language, concepts such as digital divide, digital division, and digital gap are used. (Organization for Economic Co-operation and Development [OECD], 2001) The digital divide does not only refer to access to digital technologies but also points to the differences between those who have access to new forms of information technologies and those who do not (Van Dijk, 2006; 226). As a result, such a divide brings with it the problem of an unequal distribution of wealth and welfare as well. The origin of the concept dates to the 1990s, and reports (1995, 1998, 1999, 2000) by the US National Telecommunications and Information Administration show that differences in access to new digital technology favour male, educated, affluent, white, young, urban residents. In parallel with and following these reports, several studies provide further insight into the causes and consequences of this divide and how it has developed over time. Studies conducted to focus on two main topics. The first perspective examines the issue in the socio-economic dimension related to gender, age, education, and racial differences. (Tien & Fu, 2008) Other studies examine the digital divide in spatial dimension and focus on the rural-urban dimension of the matter. (Warren, 2007; Raju, 2004) Since the late 1990s, the digital divide, which is a term commonly defined as the gap between those with and without computer and internet access, has been a central issue in the scientific and political agenda in terms of new media development. The divided can also be viewed spatially as global a phenomenon, where the main approach is on the differences between developed and developing countries (Rye, 2008; 172). When we examine the concept of the digital divide in the 21st-century world, it is noteworthy that while the gap is closing in the most developed countries in terms of physical access, the digital divide regarding the use of digital skills and applications continues to exist even widens. (Van Dijk, 2006; 229)

When we evaluate emergency remote education in the context of interaction and the digital divide, the digital gap should be removed so that people can be given equal opportunities to communicate and support their quality of life. While the digital divide poses an educational barrier against learners who do not have access to technology, it also plays an important role in the formation of socio-economic and educational gaps. Closing this gap will accelerate individuals' ability to learn, share, interact and solve problems. (Block, 2010)

RADIO IN EMERGENCY REMOTE EDUCATION

Radio ensures easier, much more affordable, and faster access to information for learners than high-tech communication media tools. Among the findings of a study conducted on the radio listening habits of university students is that students attach importance to the functions of the radio, especially in terms of updating information and awareness, and that most of the young people prefer to listen to the radio from their mobile devices with headphones while surfing the internet or busy doing other activities. (Eken & Gezmen, 2020; 129-130). The information-sharing process is changing towards learner-centred learning environments and collaborative real-life interactions with interactive radio programs in remote education. (Yuzer & Kurubacak; 2004) The integration of radio with digital-based applications has given radio a much more functional dimension in terms of interaction and mutual communication and has led to the radio having a structure that can carry learners from a passive position to an active position while fulfilling its educational function. (Tufan, 2014; 112) Remote education with radio is an alternative education system used in many countries such as Canada, China, France, Germany, Japan, and India, and especially in the USA and England. As a result, educational radio broadcasts have started a new era in remote education with their ability to easily transmit audio elements for mass broadcasting, regardless of budget, time, and region (Kiyik Kicir et al., 2019; 12). Radio does not require a special place and a dedicated time frame as television or other mass media. Listeners can reach radio channels more easily and quickly than other mass

media and listen to the radio while continuing doing their daily tasks. In addition to the foregoing, radio is a communication tool that will allow fast two-way communication and interaction in remote education. Implementing the use of radio as an auxiliary tool while designing remote education, adding audio, effects, and music elements to the educational materials, and designing them in radio format will be a motivation-increasing factor. Considering the individual learning environment of remote education, the fact that radio is a personal tool and that it will provide an individual interaction for the student should also be considered as the advantage of using radio in remote education. As no one can come between the radio and the listener, it will help the student to focus on the educational content on the radio individually. While designing remote education in a synchronous and asynchronous manner, the active use of radio in both parts will not only provide student-teacher interaction but also allow the student to have the opportunity to learn individually anywhere and anytime without any restriction of space and time. Radio, integrated with mobile technologies, will provide access to education from anywhere and the learner the opportunity to receive education at any time of the day, and in cases where there is a lack of information, it will also provide the advantage of learning the subject for the student. (Kiyik Kicir et al., 2019; 10)

Studies conducted on this subject reveal that radio is an important educational channel in the development of dialogue and innovation from past to present. Radio is being widely used as an educational tool in developing countries. Published reports confirm that educational programs on a wide variety of topics are supported by radio broadcasting in many different countries such as: Thailand, to teach mathematics to school children, India, for rural development, Swaziland, for public health purposes, Mali, for literacy training, Columbia, for various programs, Mexico, for literacy training and other programs, Nigeria, for management courses for the agriculture sector, Kenya, in support of correspondence courses, Nicaragua, for health education, The Philippines, for nutrition education, Guatemala, in order to promote changes in farming practices and to improve production, Sri Lanka, for family planning and health, Trinidad and Tobago, to promote knowledge of breastfeeding, South Korea, in support of family planning, Botswana, for civics education, The Dominion Republic, in support of primary education, Paraguay, to offer primary school instruction, are the education programs designed in different parts of the world until the 90's (NG Nwaerondu & G. Thompson, 1987). Studies conducted reveal that there is no single "best" format in terms of educational radios. Every situation where educational radio is used may include unique features that will affect instructional design processes. In the study conducted by Yuzer and Kurubacak, the structuring of the strategic technology plan is mentioned as the first step within this framework. Mixed broadcasting strategies to be used in educational radio programs support learners in exchanging their real-life experiences with the real-life experiences of others. This interactivity affects and improves learner development. Free exercises of the high rhythm of real-life through experience and knowledge sharing process between learners and the community develop people's critical skills and competencies in remote education. (Yuzer & Kurubacak, 2004) Therefore, in the article in which the answer for the question "Is an educational university radio model possible that prioritizes learner-instructor, learner-content, learner/learner, learner/material/institution interaction?" is sought, in the context of interaction and digital divide concepts within the framework of emergency remote education applications, the use of radio for educational purposes as a tool that prevents access restrictions caused by interaction and digital divide in emergency remote education is considered extremely important.

METHOD

Purpose, Limitation and Population

In this exploratory study, the main aim is to see the usefulness of university radio for education during a pandemic by looking at the experiences gained during the Covid 19 pandemic period. This study investigates the radio programme listening preferences of Eskisehir Technical University students and academics. The expectation from the study is that by investigating programme preferences of participants, a better programme schedules and programme types/themes can be created to be useful on an emergency education period.

In this study the population of the listeners of the Eskisehir Technical University radio is estimated at 14.000. Sample size is calculated by the following formula:

$$n=\pi(1-\boldsymbol{\pi})(z/E)^2$$

In the equation, where π represents the population proportion for a parameter to be estimated which usually taken as 0.50, such as the gender of the participants, z is the standard normal value from the standard normal distribution for the given confidence level, and E is the margin of error. The sample size formula requires the margin of error and level of confidence for the estimated parameters. Since this is a social study and there is no previous study to find a prior estimated values for the parameters, the acceptable margin of error for the parameter estimate is chosen as 5%. The confidence level of the estimation is chosen as 90%. The z value from the standard normal distribution for 90% confidence level is 1.65. Let's put these values in to our formula as follows (Groves 2009).

n=0.50(1-0.50)(1.65/0.05)^2=272.25≅273

Therefore, the minimum sample size is 273. The questionnaire is sent to in total 14000 students and academics via institutional e-mail. After initial cleaning and organization of the survey responses, it was seen that 418 participants had been listeners of the radio. In this study, only real radio listeners are investigated. The expected minimum sample size was 273, therefore the minimum sample size required for the study is satisfied.

The first part of the survey is created for demographic information of the participants. The second part of the questionnaire consisted of questions on the radio program listening times of academics and students. The third part of the questionnaire included a 20-item scale to determine the radio program type preferences of the participants. Among the 418 participants, 78.9% were students and 21.1% were academics. The main limitation of the study is to find the exact listeners of radio during the pandemic period since the pandemic period broke the usual behaviours of individuals. In the following sections some of the main results are given.

Radio Listening Times

Table 1 show the contingency table for participants for weekday listening times vs listener's occupation (academic or student). Table 2 gives the result of Chi-square test for the contingency table given in Table 1. As can be seen by the frequencies cross tabulated in Table 1, there is a statistically significant relationship between weekday listening times and occupation (X^2=32.507; p < .001).

Table 1. Contingency table for Radio Listening Times on Weekdays of Academics and Students

			Student	Academic	n
How many hours a day do you listen to the radio on average on weekdays?	0-1 hour	Count	212.00	31.00	243
		Adj. Residual	4.90	-4.90	
		p-value	0.00000096	0.00000096	
	1-2 hours	Count	78.00	28.00	106
		Adj. Residual	-1.57	1.57	
		p-value	0.116	0.116	
	2-4 hours	Count	28.00	16.00	44
		Adj. Residual	-2.63	2.63	
		p-value	0.0085	0.0085	
	more than 4 hours	Count	12.00	13.00	25
		Adj. Residual	-3.91	3.91	
		p-value	0.0000923	0.0000923	
Total		Count	330	88	418

Table 2. Radio Listening Times on Weekdays of Academics and Students Chi-Square test

	Value	d.f.	Asymptotic Significance (2-sided)
Pearson Chi-Square	32.507[a]	3	.000
Likelihood Ratio	30.023	3	.000
Linear-by-Linear Association	32.270	1	.000
N of Valid Cases	418		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 5.26.

Table 3 show the contingency table for participants for weekend listening times vs listener's occupation (academic or student). Table 4 gives the result of Chi-square test for the contingency table given in Table 3. As can be seen by the frequencies cross tabulated in Table 3, there is a statistically significant relationship between weekend listening times and occupation (X^2=23.270; p < .001).

Table 3. Contingency table for Radio Listening Times on Weekends of Academics and Students

			Student	Academic	
How many hours on average do you listen to the radio on weekends?	0-1 hour	Count	205.00	40.00	245
		Adjusted Residual	2.82	-2.82	
		p-value	0.0048	0.0048	
	1-2 hours	Count	87.00	20.00	107
		Adjusted Residual	.69	-.69	
		p-value	0.4901	0.4901	
	2-4 hours	Count	25.00	15.00	40
		Adjusted Residual	-2.68	2.68	
		p-value	0.0073	0.0073	
	More than 4 hours	Count	13.00	13.00	26
		Adjusted Residual	-3.74	3.74	
		p-value	0.00018	0.00018	
Total		Count	330	88	418

Table 4. Radio Listening Times on Weekends of Academics and Students Chi-Square test

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	23.270a	3	.000
Likelihood Ratio	20.121	3	.000
Linear-by-Linear Association	19.880	1	.000
N of Valid Cases	418		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 5.47.

In Table 5 and Table 6, the preferences of the participants are cross tabulated by the amount of radio program listening vs occupation. According to Chi-Square test statistic, there is a statistically significant relationship between radio program listening times and occupation (X^2=24.817; p < .001).

Table 5. How Many Minutes Do You Listen To A Radio Program On Average vs Occupation

			Student	Academician	
How many minutes do you listen to a radio program on average?	0 - 15 min.	Count	75.00	8.00	83
		Adjusted Residual	2.92	-2.92	
		p-value	0.0035	0.0035	
	15 - 30 min.	Count	108.00	37.00	145
		Adjusted Residual	-1.52	1.52	
		p-value	0.1285	0.1285	
	30 - 45 min.	Count	82.00	11.00	93
		Adjusted Residual	2.56	-2.56	
		p-value	0.01046	0.01046	
	45 - 60 min.	Count	32.00	16.00	48
		Adjusted Residual	-2.15	2.15	
		p-value	0.0315	0.0315	
	More than 1 hour	Count	23.00	15.00	38
		Adjusted Residual	-2.86	2.86	
		p-value	0.00423	0.00423	
Total		**Count**	**320**	**87**	**407**

Table 6. Listening Time to the Radio Program Chi-Square Test

	Value	df	Asymptotic Significance
Pearson Chi-Square	24.817[a]	4	.000
Likelihood Ratio	25.347	4	.000
Linear-by-Linear Association	10.917	1	.001
N of Valid Cases	407		

0 cells (0.0%) have expected count less than 5. The minimum expected count is 8.12.

Findings Regarding the Radio Program Types/Themes

The third section of the questionnaire includes questions to find towards participants most wanted types/themes of programmes. The Participants are given a choice to show their level of agreement with 20 items and radio programme types/themes via 5-point Likert scale. The 5-point Likert scale is created as 1- It should definitely be included, 2- It can be included, 3- No idea, 4- Does not matter and 5- It should not be included. The reliability of the answers given to the statements are measured by Cronbach's alpha value. The higher the value of this coefficient, which is between 0 and 1, the more consistent the participants be, and the more reliable the results be. For 20 items, Cronbach's Alpha coefficient is calculated as 0.832 for the student group and 0.848 for the academics group. As it can be seen from these values, the participants answer to these 20 items is accepted as reliable.

Factor Analysis

20 program items were analysed by Exploratory Factor Analysis to determine sub-factors or create themed sub-categories. These 20 items can be seen in Table 11. Factor analysis is a statistical method used to transform a group of variables into new uncorrelated variables. (Ozdamar, 2004). First Kaiser-Meyer-Olkin (KMO) and Bartlett's Test of Sphericity are applied to see the data's suitability for exploratory factor analysis. A high KMO value indicates that each variable in the scale can be predicted perfectly by other variables (Kaiser, 1974). To ensure sample adequacy, the KMO value must be above 0.5. In this study, KMO was 0.766 for the student group and 0.664 for the academic group. Both values indicate that the results from 20 items suitable to carry out factor analysis. Bartlett's Test of Sphericity was used to test the suitability of the data for factor analysis. Bartlett's Test of Sphericity tests the probability of high correlations between at least some of the variables in the correlation matrix. In the analysis, the X^2 value of Barlett's Test of Sphericity was calculated as 1249.885 (p=.000) for the student group and 612.187 (p=.000) for the academic group, and these values are statistically significant with 95% confidence. The results of the Kaiser-Meyer-Olkin Test and Barlett's Test of Sphericity for students and academics are given in Table 7 and Table 8, respectively.

Table 7. Kaiser-Mayer-Olkin (KMO) and Bartlett's Test (Student)

Kaiser-Meyer-Olkin Sample Adequacy Test		.766
Bartlett's Test of Sphericity Approximate Chi- Square		1249.885
	Degree of freedom (df)	190
	Significance	.000

Table 8. Kaiser-Mayer-Olkin (KMO) and Bartlett's Test (Academic)

Kaiser-Meyer-Olkin Sample Adequacy Test		.664
Bartlett's Test of Sphericity Approximate Chi- Square		612.187
	Degree of freedom (df)	190
	Significance	.000

Principal component analysis was used to determine the initial factor loadings in exploratory factor analysis. The explained variance table of the factor analysis of student and academic groups and their rotated factor analysis values are presented in Table 9 and Table 10 respectively. In factor analysis, the equamax rotation method, which the number of variables that load highly on a factor and the number of factors needed to explain a variable are minimized, is used.

Table 9. Explained Variance Table for Student

Factorrrror	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotated Sums of Squared Loadings		
	Total	Var. (%)	Cum. (%)	Total	Var. (%)	Cum (%)	Total	Var. (%)	Cum. (%)
1	5.018	25.092	25.092	5.018	25.092	25.092	2.547	12.736	12.736
2	2.200	11.000	36.092	2.200	11.000	36.092	2.421	12.104	24.840
3	1.738	8.688	44.780	1.738	8.688	44.780	2.331	11.655	36.494
4	1.395	6.976	51.756	1.395	6.976	51.756	1.879	9.395	45.889
5	1.125	5.623	57.380	1.125	5.623	57.380	1.697	8.483	54.373
6	1.012	5.062	62.442	1.012	5.062	62.442	1.614	8.069	62.442
7	.955	4.773	67.215						
8	.933	4.663	71.878						
9	.791	3.956	75.834						
10	.705	3.527	79.361						
11	.630	3.150	82.511						
12	.550	2.749	85.260						
13	.504	2.520	87.780						
14	.484	2.421	90.201						
15	.446	2.231	92.432						
16	.422	2.110	94.541						
17	.338	1.690	96.231						
18	.306	1.532	97.763						
19	.252	1.260	99.023						
20	.195	.977	100.000						

Table 10. Explained Variance Table for Academic

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotated Sums of Squared Loadings		
	Total	Var. (%)	Cum. (%)	Total	Var. (%)	Cum. (%)	Total	Var. (%)	Cum. (%)
1	5.875	29.376	29.376	5.875	29.376	29.376	3.191	15.956	15.956
2	2.452	12.262	41.638	2.452	12.262	41.638	2.592	12.960	28.917
3	1.876	9.378	51.016	1.876	9.378	51.016	2.491	12.454	41.370
4	1.684	8.418	59.434	1.684	8.418	59.434	2.485	12.426	53.796
5	1.477	7.387	66.821	1.477	7.387	66.821	1.857	9.286	63.082
6	1.060	5.299	72.120	1.060	5.299	72.120	1.808	9.039	72.120
7	.885	4.423	76.543						
8	.837	4.183	80.727						
9	.747	3.733	84.459						
10	.569	2.844	87.303						
11	.501	2.503	89.806						
12	.413	2.066	91.872						
13	.387	1.935	93.807						
14	.299	1.494	95.300						
15	.277	1.385	96.686						
16	.241	1.205	97.891						
17	.150	.751	98.642						
18	.127	.635	99.277						
19	.092	.461	99.738						
20	.052	.262	100.000						

In Table 9 of students explained variance, 62.442% of the total variance is explained with 6 factors. These 6 factors combine different themed programmes into same categories. In the student group, the first factor accounted for 12.736% of the total variance, the second factor accounted for 12.104%, the third factor accounted for 11.655%, the fourth factor accounted for 9.395%, the fifth factor accounted for 8.483% and the sixth factor accounted for 8.069%. As it is shown in Table 10 for academics, 72.120% of the total variance was explained with 6 factors. In the group of academicians, the first factor accounts for 15.516% of the total variance, the second factor for 12.960%, the third factor for 12.454%, the fourth factor for 12.426%, the fifth factor for 9.286% and the sixth factor for 9.039%. To convert the expressions in the questionnaire into interpretable meaningful groups, factor rotation was performed. At this stage, a rotation factor matrix was created for both groups with 6 factors. Factor loading matrix consisting of 20 items are given in Table 11 and Table 12 for students and academics, respectively.

Table 11. Rotated Component Matrix for Students

	F1	F2	F3	F4	F5	F6
National news	.870					
Local news	.806					
Economy programmes	.631					
Health programmes	.587					
Non- formal education programs		.781				
Formal education programs		.740				
Knowledge and skills radio programs		.589				
Sports documentaries		.524				
Music programs with DJ			.764			
Comedy-Talk show programs			.695			
Non- stop music programs			.620			
Concert broadcasts			.503			
Youth programs						
Culture and art programs				.861		
Radio theatre				.629		
Science programs				.501		
Sectoral programs					.799	
Talk programs with university administrators					.663	
Magazine programs						.766
Competition programs						.552

The items constituting the 6 factors are listed below based on their importance levels:

Factor 1: This factor has a variance of 12.736%.

National News, Local News, Economics Programs, Health Programs

Factor 2: This factor has a variance of 12,104%.

Non-Formal Education Programs, Formal Education Programs, Knowledge and Skill Programs, Sports Documentaries

Factor 3: This factor has a variance of 11.655%.

Music Programs with DJ, Comedy-Talk Show Programs, Nonstop Music Programs, Concert Broadcasts

Factor 4: This factor has a variance of 9.395%.

Culture and Art Programs, Radio Theatre, Science Programs

Factor 5: This factor has a variance of 8.483%.

Sectoral Programs, Talk with University Administrators Programs

Factor 6: This factor has a variance of 8,069%.

Magazine Programs, Competition Programs

According to the factor analysis for the students, availability of news programs in a university radio in compliance with the functions of the radio is seen as the most effective factor. The next important factor is the factor associated with the use of radio for educational purposes. Considering the entertainment function of the radio as well, it is seen that the 3rd factor is entertainment programs covering music broadcasts, and the 4th factor is conversation and direct presentation programs where information is shared. The types of programs that students want to meet their sectoral and institutional knowledge needs are presented as the 5th factor. It is among the findings that magazines and competitions, which are radio programs for the entertainment function of the radio and for the relaxation of the listener, are deemed as the 6th Factor. This ordering automatically gives an indication about the type of programmes importance among students, and eventually this gives a chance to broadcaster what to do in order to increase radio listeners if the schedules are created according to these results.

Now let's look at the results of academics. Table 12 gives the rotated component matrix of 6 factors for academics.

Table 12. Rotated Component Matrix for Academics

	F1	F2	F3	F4	F5	F6
Science Programs	.828					
Sectoral programs	.753					
Culture- art programs	.723					
Talk with University Administrators Programs	.677					
Health programs	.559					
Non- formal education programs		.892				
Formal education programs		.890				
Knowledge and Skill Programs		.600				
National news			.888			
Local news			.879			
Economy programs			.549			
Comedy-Talk Show Programs				.775		
Competition Programs				.691		
Youth programs				.672		
Magazine programs				.561		
Non- stop music programs					.673	
Music Programs with DJ					.628	
Concert Broadcasts					.540	.670
Radio Theatre						.621
Sport Documentaries						.503

The items constituting the 6 factors are listed below based on their importance levels:

Factor 1: This factor has a variance of 15.596%.

Science Programs, Sectoral Conversation Programs, Culture and Art Programs, Conversations with University Administrators Programs, Health Programs

Factor 2: This factor has a variance of 12,960%.

Non-Formal Education Programs, Formal Education Programs, Knowledge, and Skill Programs

Factor 3: This factor has a variance of 12.454%.

National News, Local News, Economics Programs

Factor 4: This factor has a variance of 12.426%.

Comedy-Talk Show Programs, Competition Programs, Youth Programs, Magazine Programs

Factor 5: This factor has a variance of 9.286%.

Nonstop Music Programs, Music Programs with DJ, Concert Broadcasts

Factor 6: This factor has a variance of 9.039%.

Radio Theatre, Sports Documentaries

For academics, the first factor involves programs in which the informing function of the radio is observed, and sectoral integration is ensured. The second factor is the combination of educational programs. Whereas the 3rd factor is seen as the combination of the program types in which the information and news sharing themes are the essentials. It is seen that, after the fourth factor, the programs that correspond to the entertainment and relaxation functions of the radio are started to be considered. The factor analysis emphasis that, availability of science and related methods is seen as the most effective factor. The next important factor is the factor associated with the use of radio for educational purposes. Considering the entertainment function of the radio as well, it is seen that the fourth factor is entertainment programs covering music broadcasts, and the fifth factor is conversation and direct presentation programs where information is shared.

CONCLUSION

With the Covid-19 global pandemic affecting the whole world, education has been one of the main structures which most affected by this process. The most important educational limitations of educational institutions, which quickly integrated into emergency remote education practices, were interaction and digital divide. Interaction is used in four different ways in the learning process (Tuovinen 2000; 16). These can be listed as learner-content, learner-instructor, learner-learner, and learner-material/institution. Considering the importance of strategic planning of design processes in implementing these four interaction types together for educational institutions that are rapidly integrated into emergency remote education applications, when the design process of audio-visual education materials is compared with the design process of visual education materials, it is seen that faster, easier and more affordable design solutions are possible. Given the fact that even though digital divide is narrowing in instrumental dimension in many different parts of the world, it is still widening in terms of skills and competencies, radio draws attention as a powerful tool that provides equal access to education, enables the interaction process to be structured synchronously or within the framework of the asynchronous use of learning, tutorials and materials at any time. (Mantyla 1999: 19).

Within the scope of the study, which was structured as stated, it is aimed to evaluate the expectations for the use of university radio for educational purposes during the Covid-19 pandemic process and with this aim in mind, the factors affecting the radio programme listening preferences of Eskisehir Technical University academicians and students were identified. During the data collection process of the research, a questionnaire was sent to 14000 people via institutional e-mail. The number of students and academicians who sent a response was 418. The first part of the questionnaire was structured as a systematic classification, in which demographic data were collected. The second part of the questionnaire consisted of collecting data on the radio program listening times of academicians and students. As a result, data on the duration of listening to radio on weekdays and weekends and the duration of focusing on listening to a radio program

were collected. The third part included a 20-item scale to determine the radio program types preferences of the audience consisting of academicians and students.

Even though there is a difference in factor rankings in the results of factor analysis carried out for both study groups, it is understood that the expectation from the university radio is the news, information and education functions. Factors related to news, information and education functions are ranked in the first three places in each study group. The factors related to the entertainment function of the radio are mostly seen as the 4th, 5th and 6th factors. In this framework, it is observed that the students and academicians prefer informative program configurations and content sharing on the current affairs. Taking into account the digital divide, which is expressed as the socio-economic barrier against access to digital education, despite the accelerated digital transformation process due to Covid-19 pandemic, it is understood that academicians and students have a positive attitude towards the use of university radio as a tool to support remote education. Considering the radio listening time of students and academicians and the time they listen to a program in the broadcast stream configuration, it is suggested that the time planning for informative programs can be structured as programs that correspond to long-term use. The importance of program durations in terms of genre, purpose and broadcasting period, as well as the target audience, cannot be ignored in the content design process. The findings obtained within the scope of the research indicate that inclusion of radio education programs designed as spot programs which will last between 0-15 minutes in the broadcast stream of the university radio will have a positive effect on the use of radio, and university radios, which determine their broadcasting principles within the framework of the principle of public broadcasting, will ensure equal access to the right to education, which is a fundamental human right, by considering the social benefit thereof, will also provide positive externality.

When the radio listening habits of Eskisehir Technical University students and academicians are evaluated within the scope of emergency remote education applications, it is seen that radio broadcasts can be used as a powerful tool against the digital divide. When the learner-instructor interaction is evaluated within the framework of both broadcasting times and broadcasting types, it is understood that the two-way interaction process can be structured in this framework. In this respect, as stated in the study conducted by Yuzer and Kurubacak, it is considered necessary to establish a strategic technology plan first. The education strategy established within this framework will form the basis of the strategic technology plan, which is considered a functional strategy. In this context, when the educational strategies that centre the learner who actively participates in the learning-teaching process and the research findings are evaluated together, the methods that increase the learner-instructor interaction and do not compress the learning process into mere learning materials, are considered essential in terms of activating internal communication processes, especially during crisis periods when emergency remote education applications are implemented.

According to the findings obtained in this study, it is recommended to consider the following criteria when configuring a university radio for distance education purposes.

1. Against the fact that radio as a traditional mass communication medium has disadvantages in learning processes, it is considered important to integrate radio back into educational processes by considering the digital divide as one of the important obstacles to learning.
2. In order to transform radio as a one-sided communication tool into an interactive learning tool, the structure of web radio broadcasting that allows enrichment with visual materials in educational processes should be integrated into learning processes.
3. It is considered important to enrich the educational program configurations with gamification and radio dramas.
4. In addition to being used as a distance education media in distance education processes, it is recommended to use blended learning in a supportive approach.
5. It is considered important to structure the radio education programs within the scope of blended learning or to structure the radio as a supportive teaching environment by evaluating the learning processes of the Z generation and their radio listening habits within the framework of radio listening time
6. In a university radio, it is considered important to add learning materials to the entire program flow as modules, taking into account the radio listening time of the learners.

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