ASSESSMENT OF TRAINING NEEDS IN THE FIELD OF SCIENCE JOURNALISM IN THE ARAB REGION

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INDEX

INTRODUCTION

Goethe Institut is continuously working to develop science journalism in Egypt and the Arab region through a diversity of interventions, one of which has been "Science is a story," incepted in 2017. These efforts aim at bridging the gap between scientific research and institutes from one side and journalism from the other, which works for more public engagement and counteract fake news and rumours.

To assess the needs of science communicators and journalists in the region, the institute used qualitative research methodology, through the input of 217 journalists, representing 10 Arab countries, working for print and online media platforms, who were geographically distributed as follows:

- **Maghreb:** represented by Libya, Tunisia, Algeria, Morocco, and Mauritania.
- **Levant:** represented by Lebanon, Iraq, and Jordan.
- **Nile Valley:** represented by Sudan.
- **Arabian Gulf:** represented by Yemen.

This pilot study aims to develop preliminary indicators describing the real situation of science journalism training and practice. It also targets identifying challenges that hinder the development and popularization of science journalism, whether these challenges are related to training journalists or the directions of the organizations they work for, in their countries, or challenges related to the science content they present.

This is in addition to monitoring other concerns relevant to media practice itself, including challenges with journalists' mobility, access to resources and information, and free spaces available. Journalists also face technical difficulties like language barriers and poor internet connection.

Also, there are difficulties securing funds for training opportunities, whether inside or outside the journalists' home countries, making online training through virtual classes an inevitable alternative in many cases.

METHODOLOGY

To achieve the goals mentioned earlier, we had designed a 17 questions' survey, including both open and closed-ended questions. The survey was prepared and reviewed by experts, specialized in media fieldwork, and modified afterward in light of their consultancy.

It has then been transferred to a digital version and distributed to the sample, using snowball sampling, which is well known for being a non-probability sampling technique usually chosen when it is hard to identify the community studied. It is done in a way that a small sample is selected and then grows afterward, hence the name, snowball. This is done by picking the first respondent through probability; then, the second is chosen in light of the first input. In this study, the following steps have been followed:

1- Contacting one or two science journalists from the desired community.
2- Asking them if they can identify other cases for reference.
3- Asking new respondents to identify more relevant ones and so forth.
4- Putting an end to the process when there is no chance to reach new potential candidates or the sample size is satisfactory.

In this respect, the ten countries have been identified and journalists who could link to others interested in or are already practicing science communication. The survey has been available online for one week in November 2020, where the sample size reached 217. The study aimed to explore the situation of science journalism in these countries in terms of journalists' qualifications, expertise, training needs, media outlets they work for and suggested training formats.

Qualitative analysis has been used to conclude the survey results that we can summarize through general indicators for the field study, followed by detailed results for each country.

First: Demographic characteristics of journalists (Description of the study sample).

Second: Journalistic skills studied.

Third: Features and characteristics of Arabic media outlets and their interest in science communication.

Fourth: Challenges in providing science coverage in newspapers and other studied platforms.

Fifth: Discovering the most significant training needs.

Sixth: Presenting and discussing the study in a detailed horizontal way for each country.

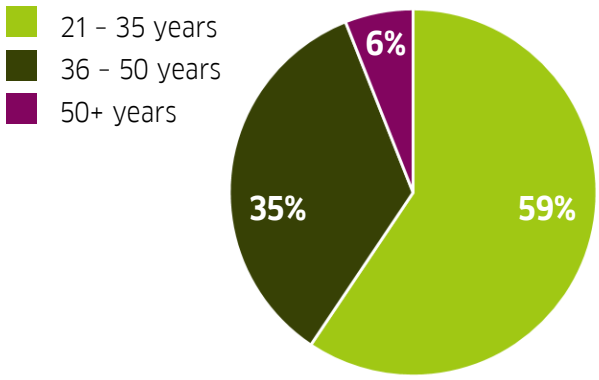
From now on, we will present and discuss the general findings of the field study.

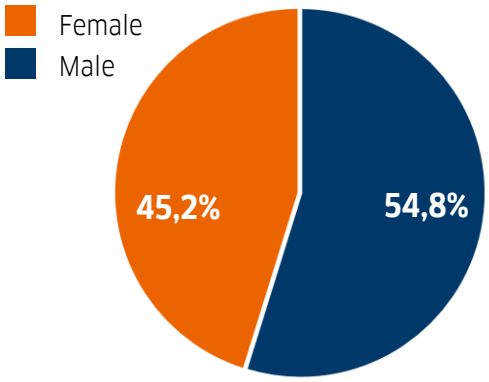
FIRST: DEMOGRAPHIC CHARACTERISTICS OF JOURNALISTS (DESCRIPTION OF THE STUDY SAMPLE)

This category includes data related to (age, gender, education level, specialization, and years of experience) and can be summarized as follows:

- **Age:** The study shows a discrepancy in age groups, where most respondents were young people (21 – 35), which exceeds 59.4% in the ten countries combined. This is followed by middle-aged practitioners (36 – 50), representing about 34.6%, leaving only 6% for older journalists (above 50).

Demographic Characteristics of the Journalists





This overall result reflects the fact that young and middle-aged journalists represent the majority of the study sample, which is, at the same time, the category targeted by the training and who show special preparedness for learning, acquiring new skills, and boosting their professional career.

- **Gender:** The interviewees were 54.8% males and 45.2% females.
- **Education:** Most interviewees hold university degrees, fewer participants haven't any university degree and very few with post-graduate degrees.

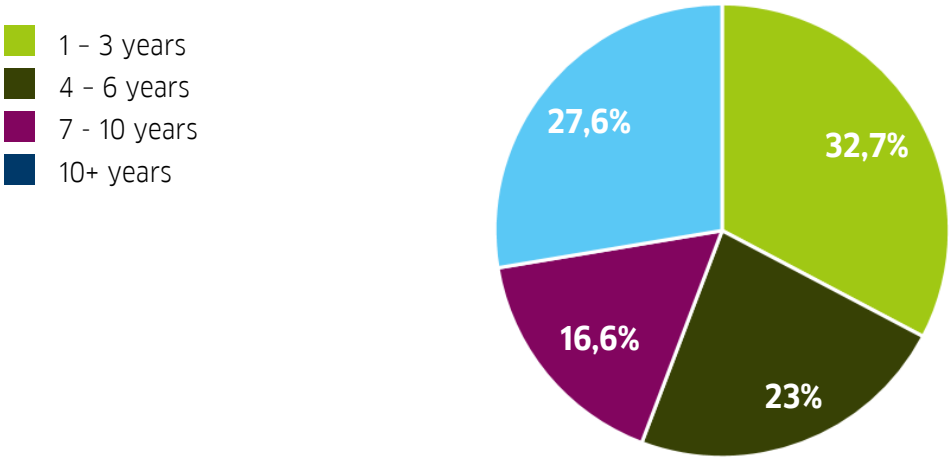
The journalists' backgrounds were diverse, although the majority studied literature, law, commerce, media, among other disciplines, followed by journalists who have scientific backgrounds like engineering, science, medicine, agriculture, information technology, pharmacy, etc.

SECOND: JOURNALISTIC SKILLS

- The study has shown several general findings and indicators about levels of professional experience and editorial capacities. For years of experience, it turned out to be comparable among interviewees, where the percentage of those having 1-3 years of experience came as 32.7%, those with 4-6 years were 23%, from 7-10 years were 16.6% and finally whose expertise reached more than ten years scored 27.6%.

This reflects the diversity of professional expertise among the journalists, where they can be categorized into beginners, midcareer, and professionals, respectively.

Years of Experience



- Regarding the **interest in covering science**, 76% of the interviewees confirmed their interest in science coverage, and the rest of them, 24%, showed indifference.
We see this as a critical finding that can be further invested in developing training programs for those interested and suggesting more in-depth studies to identify reasons behind the second group's indifference, where specific programs can be designed to engage them.

- **Media practice and language proficiency:** the study showed that most journalists could write news and features, their percentage is 37%, and those with medium proficiency scored 30%; and finally came journalists with excellent skills as 23%.

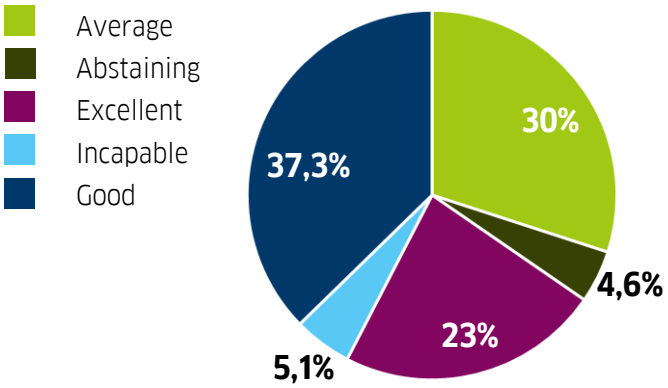
These findings demonstrate usual incompatibility among journalists' capacities, which can be linked to years of experience and field of specialization. This can be used as a basis for designing new training programs that suit the majority.

- **Interviewing skills:** the majority of journalists, 43.8%, are capable of conducting and writing interviews, those with average proficiency came as 17.5%, those who are excellent scored 30.4%, where 3.7% expressed the absence of these skills and 4.6% abstained. Like the previous point, the finding demonstrates normal incompatibility linked to experience and field of specialization, which can be used to design new training programs that suit the majority.

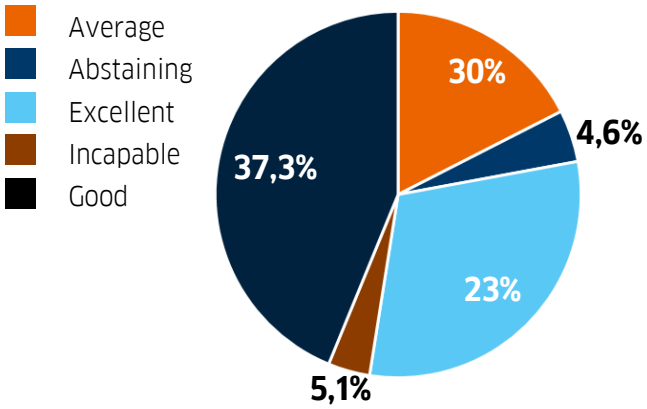
- **Writing features:** 37.8% of the journalists stated that they have the necessary skills, followed by 30.4% who expressed average skills, 15.2 said they are excellent, and 12% were incapable of writing this form of journalism.

- **Writing articles:** 37.3% of the journalists stated that they have the necessary skills, followed by 22.6% who expressed average skills, 25.3% said they are excellent, and 10.1% were incapable of doing this form of journalism. Despite the need for all categories to get trained, the group with no skills needs double effort, while the others need just more nurturing and development of already present talents and abilities.

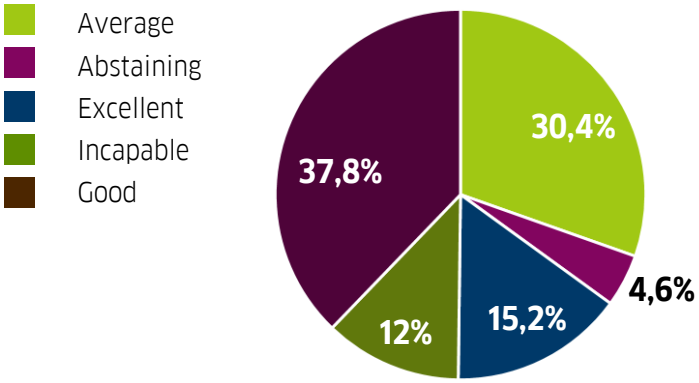
News



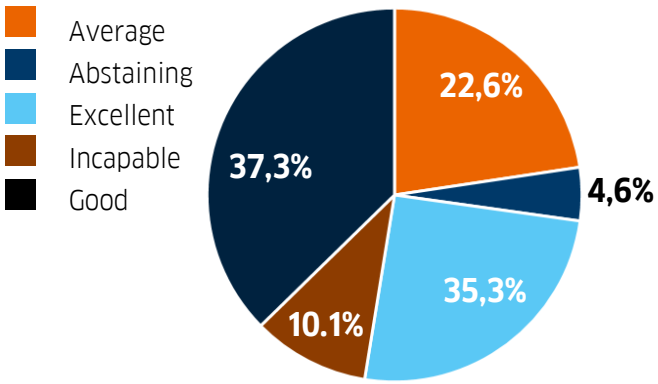
Interviews



Features and Investigations



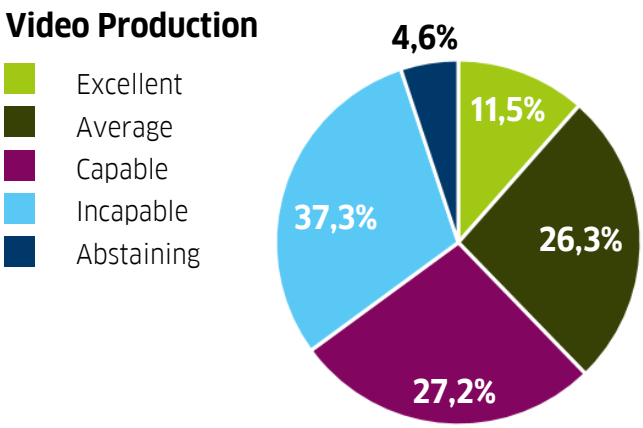
Articles

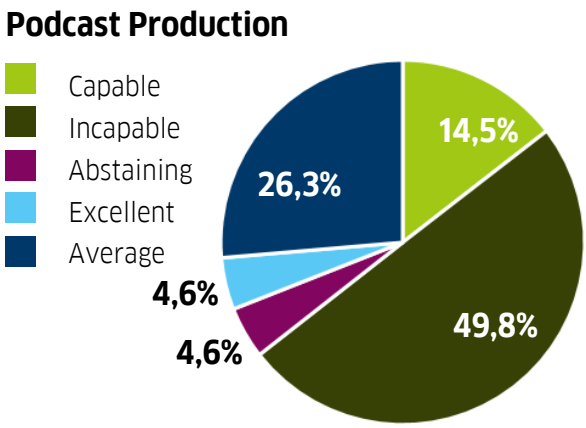


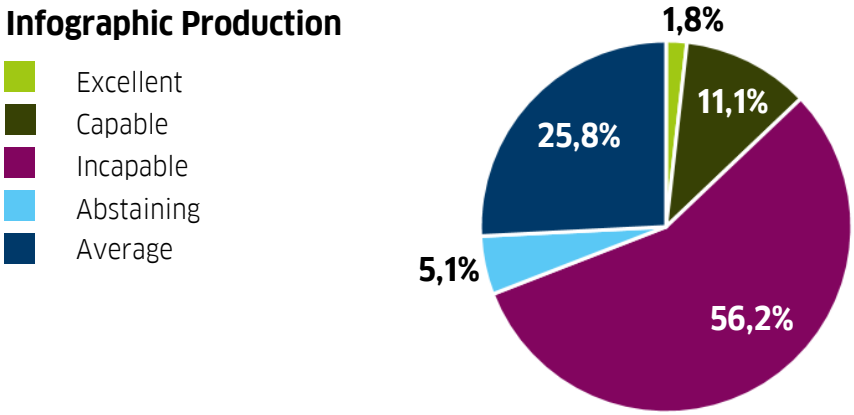
- **Video production:** 30% of the sample said they could not produce videos at all, while 27.2% can, 26.3% have average skills, and 11.5% are excellent.
This reveals an urgent need for training journalists on multimedia skills, including video production.

- **Podcasts:** Almost half of the journalists interviewed (49.8%) stated inability to produce podcasts, followed by 26.3% who said being average, then only 4.6% were excellent in producing podcasts, and 14.7% are capable, which reflects a strong need to train journalists on producing podcasts.

- **Infographics:** About 56.2% stated absence of these skills, 11.1% are capable, and 25.8% are average; this highlights the necessity of training journalists on producing infographics, either as a separate production or to support other journalistic pieces.



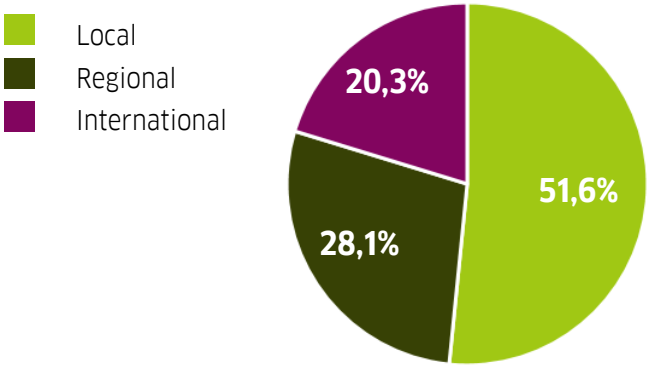




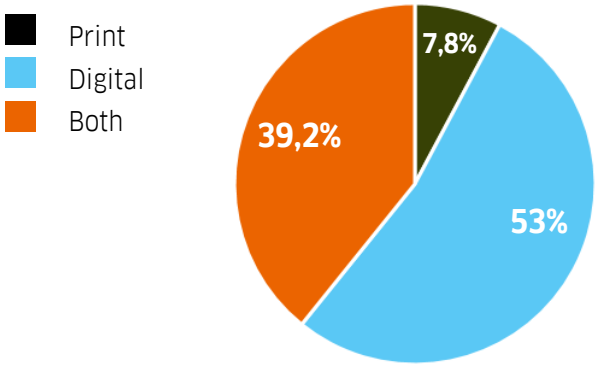
THIRD: FEATURES AND CHARACTERISTICS OF ARAB MEDIA HOUSES AND THEIR INTEREST IN SCIENCE COMMUNICATION

- Nature of work: percentage of journalists working for online media, whether websites, platforms, or blogs, mounted up to 53%, journalists belong to other media outlets that have both print and online production, was 39.2%. Finally, media outlets that have only a print version came as the lowest, 7.8%.

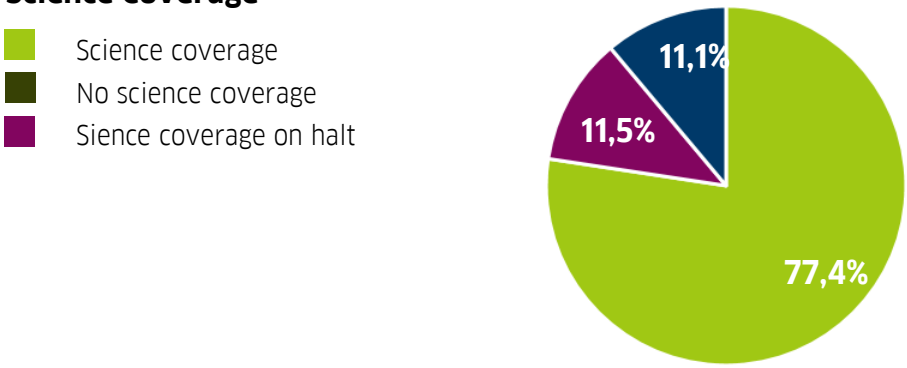
Geographical scope of the coverage



Publisher



Science Coverage

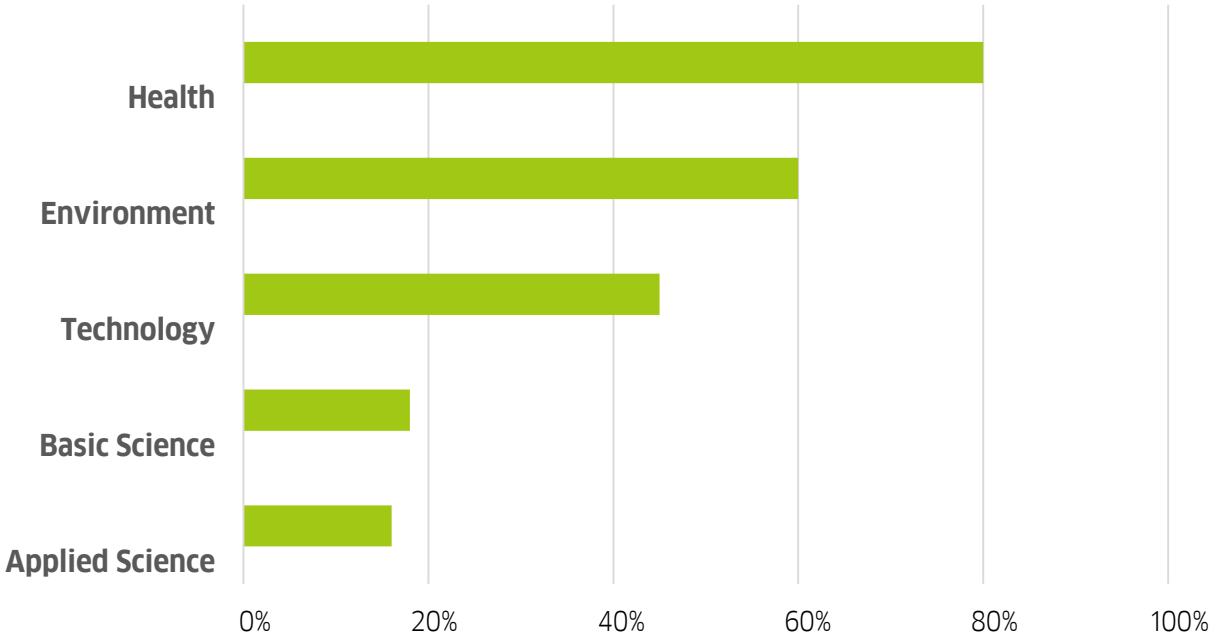


- **Publishing science stories:** The study shows that 77.4% of media outlets have interest in science coverage, others do not offer any kind of science coverage 11.5%, and the last category represents those who have been publishing science stories before and currently stopped 11.1%. This is considered a positive finding that can be of value by training and building journalists' capacities in science coverage, based on media houses' interest in science stories.

- **Geographical Scope:** The study demonstrates the diversity of media coverage in general, and science coverage in particular, where science stories are either local 51.6%, or regional 28.1, or international 20.3%; this confirms the local nature of the stories in the Arab countries included in the study.

- **Language:** the Arabic language is mostly used in science coverage, it is almost the only language used in stories, and science is no exception; it is estimated to be about 98.2% of the coverage, according to the sample. This is followed by the English language that came at 1.4 %, and French came at 0.5%. This points out the Arabic language's prevalence as the primary language and perhaps the only one suitable for science media training.

- **The most covered topics:** Health and medical issues, topped the list in the given countries, followed by environment, technology, basic sciences, and finally, issues related to applied sciences.



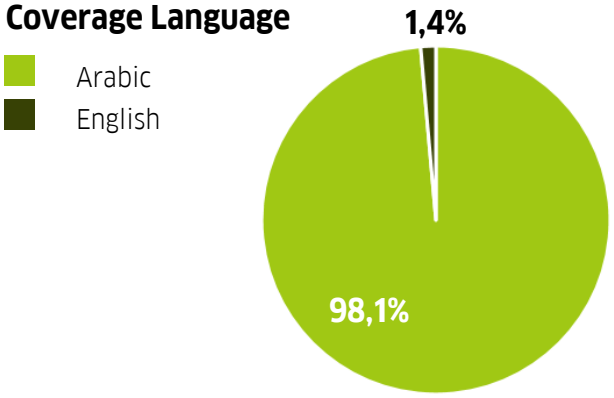
This finding can be attributed to the spread of diseases and pandemics worldwide through the last quarter of the century, despite the huge advances in science and technology. Perhaps this is also because health is closely linked to human race life and death, taking into account the people's psychology amid Coronavirus spread; everyone became obsessed about the pandemic's spread, prophylaxis, and treatment, especially with increased numbers of cases.

- **Allocating specific space for science coverage:** The study found a lack of interest in covering different science topics, where the majority publishes science stories on an irregular basis (41.5%), followed by producing science stories under local news and miscellaneous (29%).

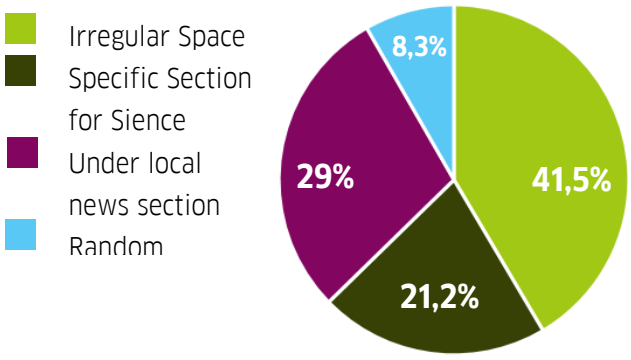
There have also been outlets that have specific sections for science topics 21.2%. The rest has been outlets with neither a particular science section nor a fixed pattern of publishing science stories, where stories are produced whenever there is available material; this category came the last with 8.3%.

The percentages mentioned above reflects the confusion of media houses concerning publishing science stories.

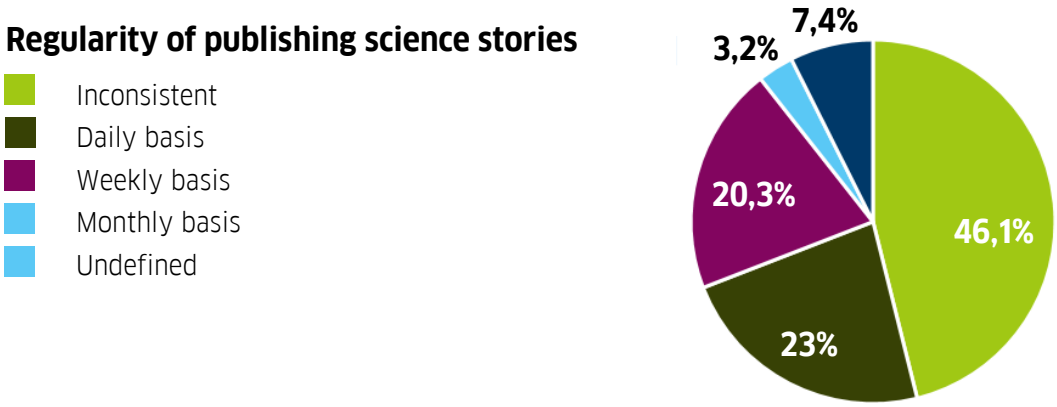
Coverage Language



Allocated Space of Science Coverage



Regularity of publishing science stories



- **The regularity of publishing science stories:** The study shows a continued lack of interest for science stories, evident by inconsistencies in the frequency of producing

science news and features that reached 46.1% in the 10 countries combined. This is followed by publishing science stories daily that came as 23%, on a weekly basis 20.3% and irregular coverage 7.4% and finally publishing on a monthly basis reached 3.2%. This result reflects consistency in the general decline in the interest to cover science, both on having specific sections or consistent publishing. These indicators shed light on the necessity of reforming trends and policies adopted by media houses, whether print or online portals.

FOURTH: CHALLENGES OF PRESENTING SCIENCE COVERAGE IN STUDIED NEWSPAPERS AND PORTALS

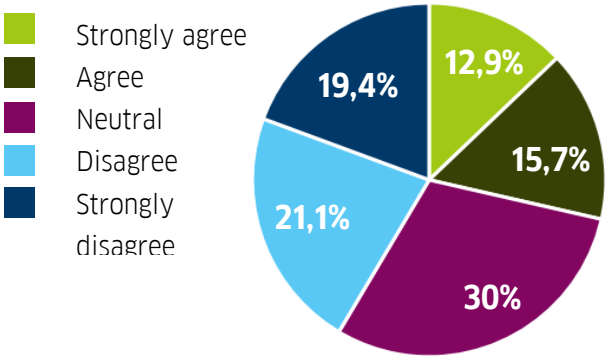
The study findings show some challenges and difficulties outlined by journalists as impediments against providing specialized scientific coverage, including health, environment, technology, agriculture, computers and networks, internet, biology, and other science stories. Detailed results were as follows:

- **Science is a dry subject**, and scientific issues and findings are usually hard to understand; this sentence was given to journalists to agree or disagree on a scale of 5, including strongly agree, agree, neutral, disagree, and strongly disagree. Those who voted for neutral were 30% of the sample, disagree 22.1% (they do not find science topics dry or hard to comprehend.), strongly disagree 19.4%, 15.7% agreed to the statement, and 12.9% strongly agreed.

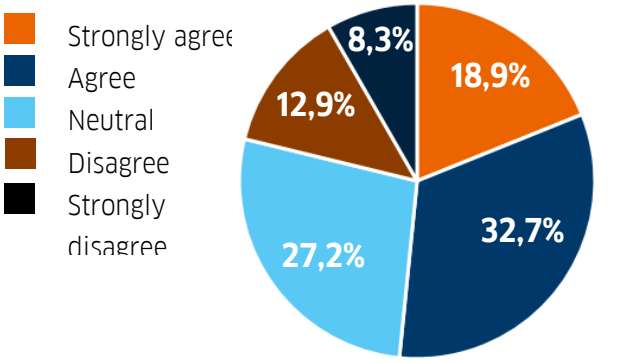
This result demonstrates that most journalists discourage the idea that science is a tough subject; on the contrary, they perceive it as comprehendible content that can be simplified and conveyed to their audiences. This is a highly positive finding that reflects the journalists' understanding of the essence of science, its significance, and the ability to present it in simple and attractive formats.

- **The second challenge enlisted was the hardships of communicating with scientists and researchers.** In this respect, the journalists' responses came as follows: The majority of the sample agrees they face this challenge 32.7%, whereas 27.2% were neutral, 18.9% of the sample strongly agreed to the statement, 12.9% disagreed, and 8.3% strongly disagreed. Overall, this emphasizes the significance of exerting more efforts to facilitate the journalists' access to resources and information; to help them do their job.

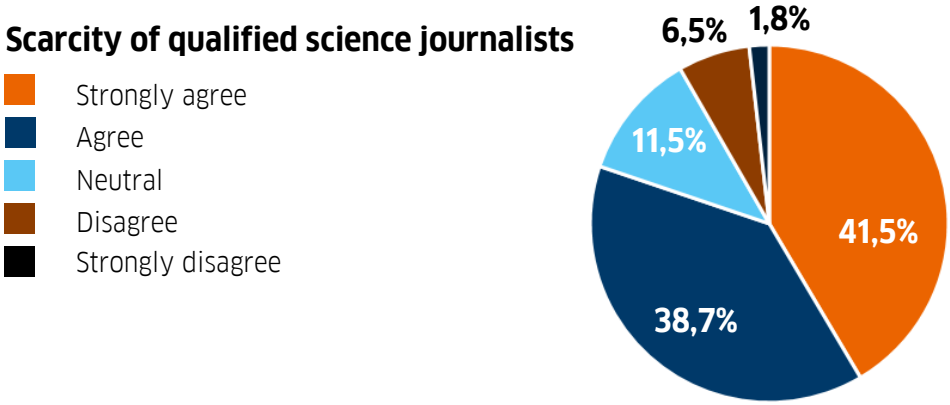
Science is a dry subject



Hardship of communicating with scientists



Scarcity of qualified science journalists



- **The third Challenge studied was the scarcity of specialized journalists capable of covering science topics.** Here, the majority approved this scarcity, they mount up to 80.2%, divided into strongly agree to the statement 41.5%, and agree 38.7%, journalists who were neutral came as 11.5%, whereas journalists disagreeing to the statement reached 6.5%, and those who strongly disagree were 2% only. This shows a consensus that very few journalists are currently capable of covering science stories, with the subsequent necessity of having new generations of science journalists and building the current ones' capacities to meet the market needs and demands.

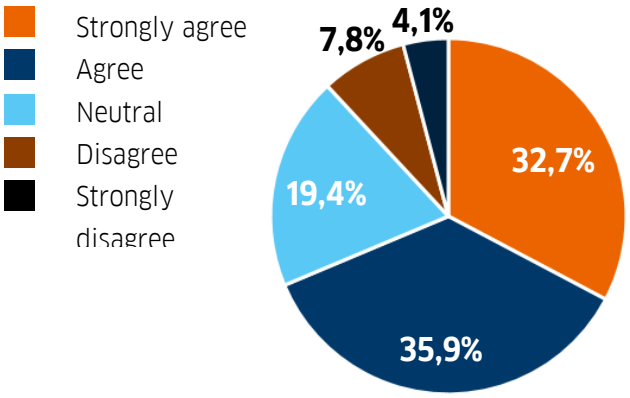
- **Fourth Challenge: Policies of newspapers and other media houses that are not in favor of covering science.** To this statement, 35.9% agreed, which is the majority of the sample, where 19.4% were neutral, 32.7% strongly agreed, 7.8% disagreed, and 4.2 strongly disagreed.

This means the majority of journalists are dealing with this challenge and that policies of different media portals and websites might represent a strong hindrance for them to publish science stories.

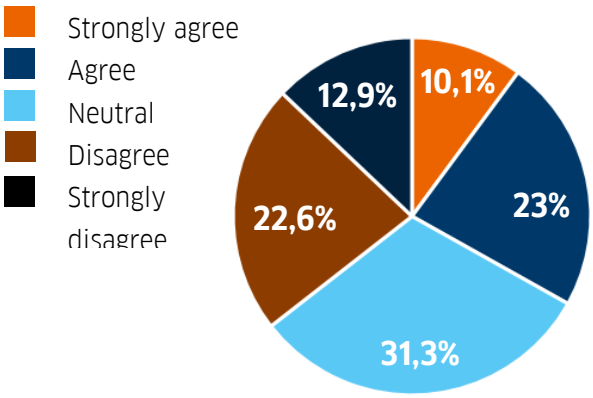
- **Fifth Challenge: The public does not have sufficient interest and is not engaged in science stories.** Here, neutral journalists reached 31.3%, whereas 23% agreed, 22.6% disagreed, 12.9% strongly disagreed, and 10.1 strongly agreed.

This is a positive finding, as journalists believe science stories are still appealing, not as the common misconception goes. This coincides with a previous result that showed journalists' rejection of the idea of science as a tough or dry subject. In conclusion, science is an interesting subject and can be simplified.

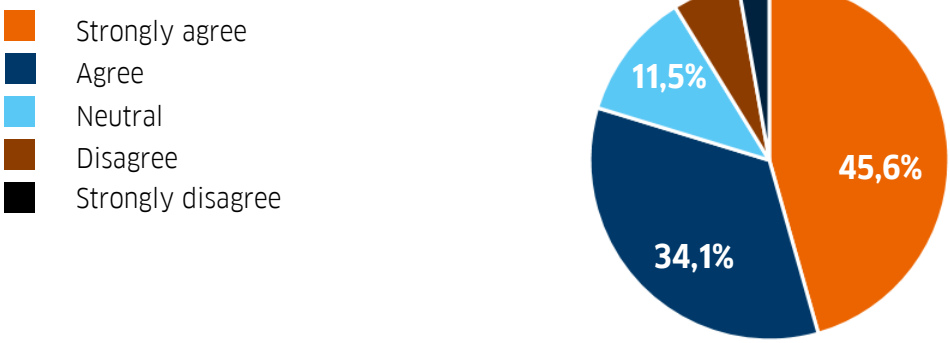
Policies of newspapers and media houses



Public is not interested in science



Lack of training of science editors



- **Sixth Challenge: There is a lack of training and capacity building for specialized science editors:** 45.6% strongly agree to this statement, which is the majority, while 34.1% agree; this makes them a combined 79.7%. This is followed by 11.5% neutral, 6% disagree, and 2.8% strongly disagree.

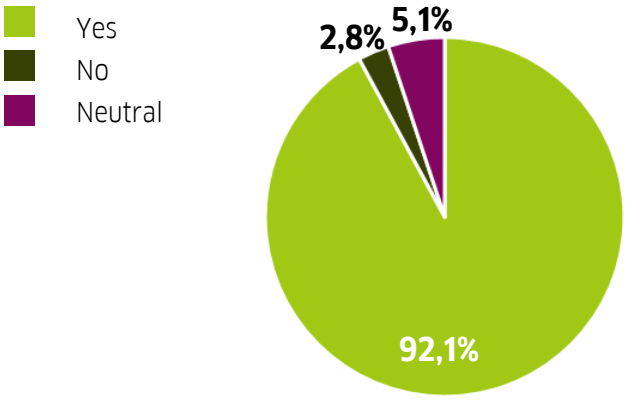
This demonstrates a general agreement to the lack of qualified editors, which signifies the need for training editors to build their capacities in editing science stories.

FIFTH: MOST PROMINENT TRAINING NEEDS OF JOURNALISTS INVOLVED IN THE STUDY

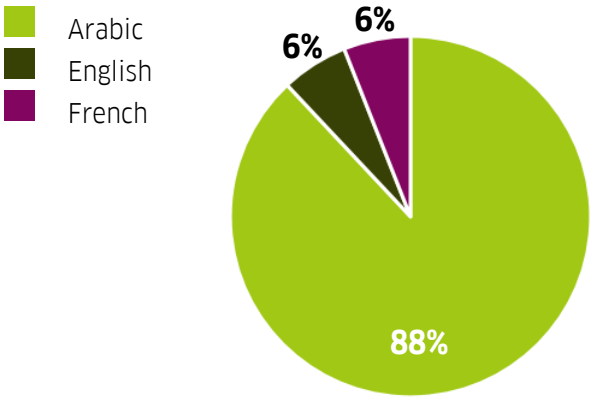
- In light of the previous findings, especially related to journalists' skills and capacities, 92.2% expressed their strong desire to advance their science journalism skills. However, only 7.8% didn't feel this need. This matches previous findings for this study and showed that a very few percentages of science journalists have excellent skills in all journalistic, traditional, and multimedia skills, whether video journalism, infographics, podcast, or others.

The significant number of journalists (69.1%) in the sample had voiced their need to master producing multimedia, whereas 25.8% stated their need to learn how to write in-depth science features and analyses; the rest didn't identify specific training needs.

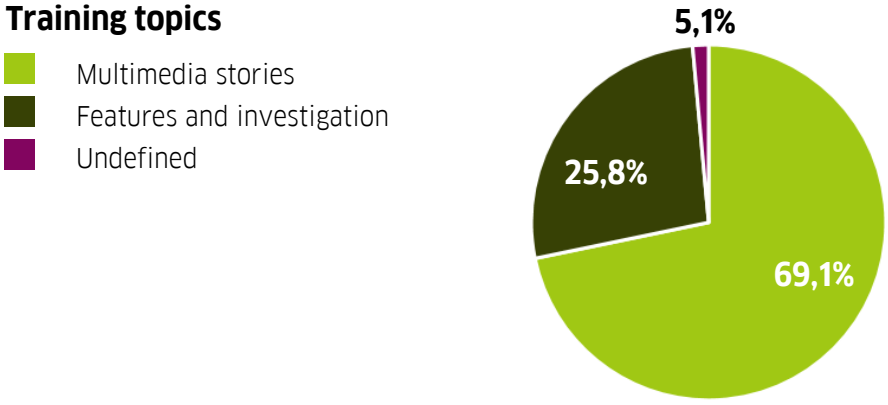
Desire to have the training



Training language



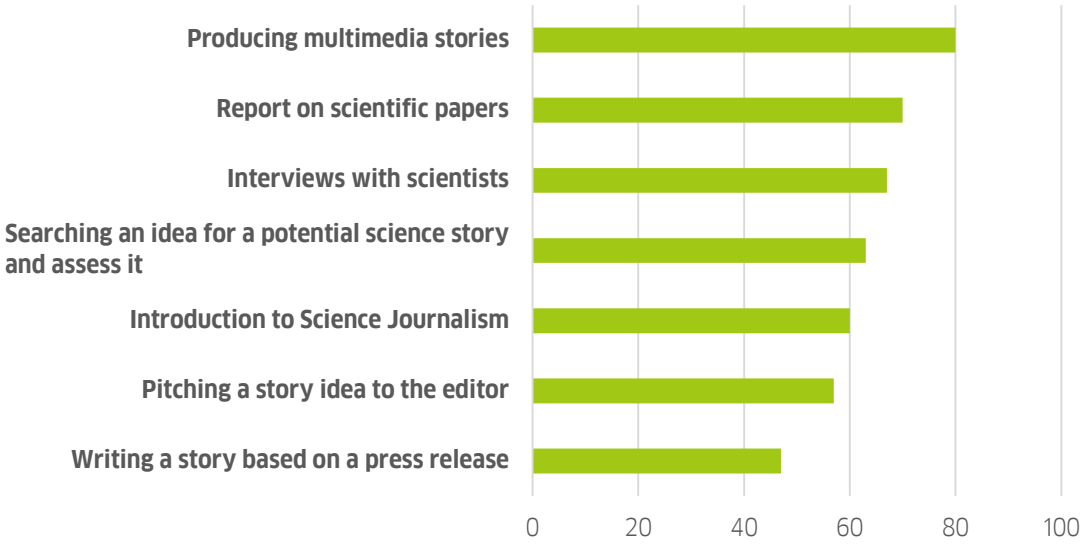
Training topics



- Responses we got from journalists of the ten countries involved in the study emphasized a strong need for training on presenting science content in an engaging way that keeps the audiences informed on urgent science topics, how to access reliable scientific resources, how to reach an idea for a potential science story and further assess it. Also, how to report on scientific papers, how to produce multimedia stories, in addition to the need for a basic introduction about science journalism.

Consequently, all these needs can be gathered and studied in light of results related to journalists' skills and abilities and identified gaps and training needs.

Topic Needs

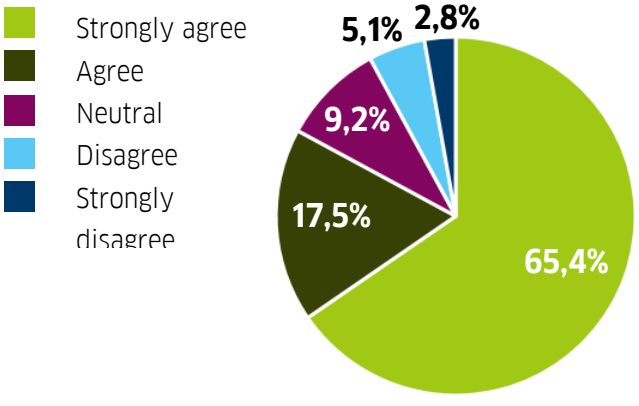


- Looking into responses from the sample, it has been evident that the majority needs training in science journalism, to be conducted in their mother tongue, they reached 88%, whereas 6% wants the training to be in English, and the remaining 6% wants to take it in French. This is a very logical and expected result that resonates with a previous finding revealing that the Arabic language is the prevalent language in countries included in the study.

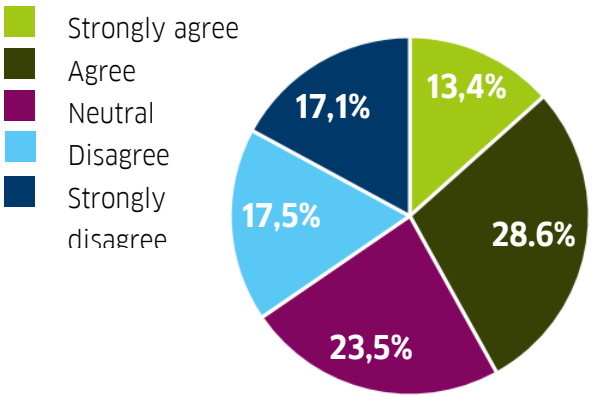
- Concerning the nature and format of the training, most journalists expressed their interest in face-to-face training, they mounted to 82.9%, divided between those who strongly agree (65.4%) and those who agree (17.5%). However, the nature of the training wasn't a significant concern for some journalists who were neutral, they were 9.2%, while the remaining 7.9% disagreed with the face to face training, perhaps due to travel hardships and uncertainties linked to Covid-19 pandemic; with no precise schedules of vaccines distribution.

- The idea of virtual lectures generated confusing results, where all the results came so close to each other, where 13.4% strongly agreed, 28.6% agreed, 23.5% were neutral, 17.5 disagreed, and 17.1% strongly disagreed.
This finding is quite expected after the Covid-19 pandemic took the world by storm, with subsequent consequences related to technical difficulties and technical issues in training courses, added to traditional ones of inability to travel, travel and accommodation expenses, and problems of mobility in conflict areas like Iraq, Libya, Yemen, and Lebanon.

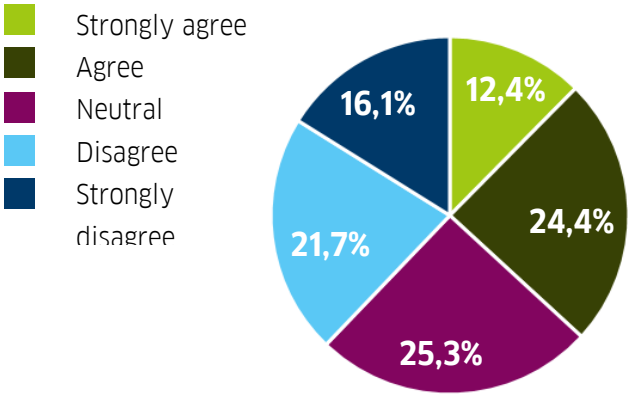
Face-to-face training



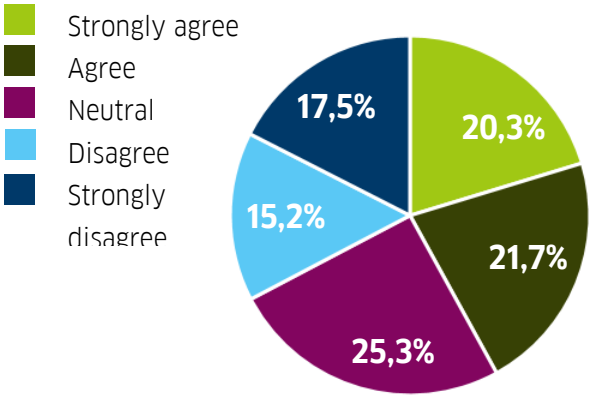
Virtual classes



Training through podcasts



Complete virtual training

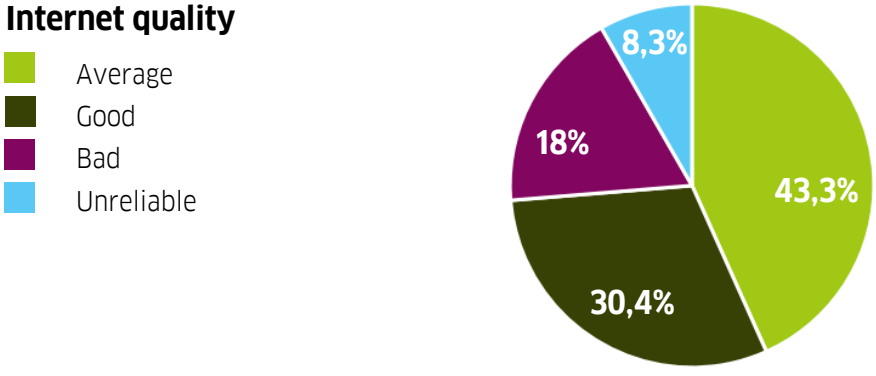


- In this respect, 25.3% of the sample were neutral on training through a podcast, while 24.4% agreed, 12.4% strongly agreed, 21.7% disagreed, and 16.1% strongly disagreed. This result matches the previous one and reflects uncertainty indicators to the Covid-19 pandemic, with no clear vision of its repercussions on everyday life, activities, education, or training.

- Journalists who agreed to complete training through the internet were 21.7%, where 20.3% strongly agreed, neutral journalists were 25.3%, whereas 15.2% disagreed to it and 17.5% strongly disagreed.

- Responding to the Covid-19 pandemic and the potential of its continuation with new waves, the sample of the study was asked about the internet quality in their respective countries, to which their replies came as follows: 43.3% stated that they have average internet quality, 30.4% said it is good, 18% stated that the internet is bad and 8.3% replied that the internet is unreliable and it cannot be at all used for training even during the pandemic.

Internet quality



SUMMARY OF THE MAIN STUDY FINDINGS

- The majority of the journalists were young people, in the age group 21 – 35, which represented 60% of the sample from the ten countries combined, with an almost equal percentage of males and females; 45% females and 55% males. Most journalists have university degrees; the majority, 56%, were beginners and mid-career professionals.

- Despite the interest of 76% of the journalists covering science stories yet, 67% of them are not distinguished in covering science news and stories, and 60% are not special in either conducting interviews or writing science articles and features.

- There is a significant deficiency in multimedia production skills, where only 12% of the sample are mastering video production, 4.6% are distinct in producing podcasts, and 11 are superior in producing infographics.

- The majority of media houses where journalists involved are working (92%), have online platforms or combines both print and online versions, and are fundamentally Arabic-speaking; with more than half of its production focuses on local matters.

- More than 77% of media outlets involved have varying degrees of science coverage, and priority is given to health issues, as the main field of science coverage, although the coverage is inconsistent in the science section or the whole publication.

- Although more than 70% of the sample believe that science is not a dry subject, an appealing content for a considerable percentage of their readers, most of them find difficulties dealing with scientists and researchers while covering science stories. It is also confirmed that there is a lack of serious directions in media outlets for giving space and interest to science content.

- Most journalists (92%) believe they need training in different science journalism skills, 70% pointed out their needs in multimedia production, while 25% only stated their need to get trained on writing science analyses and features.

- Most interviewees stated their desire to have the training in Arabic; 80% prefer face to face training. Nevertheless, most of them agree to have it online amid the global pandemic, where most of them assess their internet quality as good, which enables them to commit to such training.

SIXTH: PRESENTING AND DISCUSSING THE STUDY IN A DETAILED HORIZONTAL WAY IN RESPECTIVE COUNTRIES

1- Tunisia

- Concerning Tunisia, from which 35 journalists joined the study, represented 16.1% of the total study sample, the percentage of youth in the age group from 21-35 reached 51.43%, while the percentage of middle-aged journalists in the age group of 36 -50, 40% and 8.57% for the age group over 50 years old.

- The female journalists constituted the predominant percentage of journalists who responded to the questionnaire in Tunisia who work in science journalism and those interested in covering science and science issues, at a rate of 68.5% compared to 31.4% for males.

- Levels of experience in practicing science journalism in Tunisia graded the following percentages: 37.1% possess professional experience exceeding ten years, 28.5% have beginners experience from one to three years, 20% possess experience of 4-6 years, and the remaining 14.2% were for owners of professional experience of 7-10 years, which means that Tunisia is full of various professional experience in science journalism and that the majority of workers in this specialty have long professional experiences.

- The majority of journalists in Tunisia work in news websites and online platforms, at a rate of 57.1%, while about 34.2% of journalists work in media organizations that combine printed paper newspapers with digital platforms. In contrast, the lowest percentage of journalists work in printed newspapers only, and they constitute 8.5% of the total Journalists studied in Tunisia.

- Local coverage prevails over the geographical range of coverage of Tunisian newspapers, websites, and online platforms for public and science issues with allegiance by up to 60%. In comparison, international coverage represents 22.8%, and regional coverage by 17.1%, which means that the dominant trend on Tunisian institutions, newspapers, websites, and platforms is the local domestic issues, in covering the science issues, and that the exceptions in science coverage are the international and regional scope, and in these Tunisian media may rely on news agencies in this regard.

- The analytical study proved that the Arabic language is the predominant language for publishing issues of science and technology in Tunisia at a rate of 100%, which is an important result in knowing and determining the language of training in scientific media

skills, especially and there are previous studies that referred to other languages such as French, but the sample of the current study confirmed the primacy of the Arabic language in all publications and digital platforms in Tunisia.

- 80% of the sample of journalists in Tunisia confirmed that their newspapers and digital platforms provide coverage of science issues, while 11.4% of the sample went to say that their media work bodies do not cover science issues. The remaining 8.5% confirmed that their media outlets belong to or collaborate to provide science coverage, but it no longer does.

- The results of the statistical analysis revealed the lack of interest in covering science issues in the Tunisian media; based on the survey index, the allocation of an irregular space whenever a scientific event or issue occurred came at a rate of 51.4%, followed by publishing about science in the local news and miscellaneous section at a rate of 22.8%, then not setting a specific periodical or space for publishing science-related issues at a rate of 14.2%, and publishing science coverages in a fixed section came in the last place with a grade of 11.4%, which means the weak interest in covering science issues in the Tunisian media institutions.

- In connection with the previous result, publishing about science in Tunisian media platforms came irregularly at a rate of 40%, then publishing daily by 28.5%, then publishing about science issues weekly at a rate of 17.1%, and finally publishing an indeterminate periodical at a rate of 14.2%.

- The challenges related to covering science issues are almost the same in most Arab countries included in this study. However, the differences in the percentages of these challenges and their entirety, as journalists in Tunisia refuse to view science as dry content that is difficult to understand, with a large opposition rate of up to 40% and close to the same rate as being neutral to the sentence, while the percentage of those who agreed that science is a dry content challenging to understanding came about 20% of the total sample of Tunisian journalists, which reflects the belief of the vast majority in the vitality of science converges and the possibility of delivering it in a simple, understandable way to the public.

- It seems that the difficulty of communicating with scientists and researchers is a real problem existing in Tunisia, like the rest of the Arab countries included in this study, as more than 45.7% of the journalists in Tunisia approved this problem and 20% stood by the impartiality, while 33.3% of the sample of journalists denied the existence of this problem. In conclusion, there is an existing problem in Tunisia regarding accessing specialized

scientific resources and making them available to journalists interested in covering science issues.

- Like the rest of the Arab countries, Tunisia suffers from the lack of specialized journalists who can cover scientific topics, with an approval rating of 77%, while 14.2% of the respondents stood on neutrality from this problem, while only 8.8% denied the existence of this problem as an obstacle to the practice of specialized science journalism.

- More than 71% of the journalists in Tunisia who responded to this questionnaire agreed that newspapers and media institutions' policies do not care about Science issues coverage. In comparison, about 20% of the journalists in Tunisia stood on the impartiality to this opinion, and 8% rejected the existence of this problem.

- 37.3% of Tunisia journalists believe that science and scientific issues do not receive readers' attention, while 28.5% stand neutral to this matter, while 34.2% oppose this statement.

- 80.1% of the study sample admits that there is a weakness in training and capacity building of science editors or those journalists interested in covering science in Tunisia. While 11.4% of the sample stand to be neutral to this matter, and 8.5% oppose the existence of this problem.

- About 82.8% of the journalists under study reported the existence of press institutions, newspapers, or websites that cover science in Tunisia, and the remaining 17.2% saw the absence of these distinguished institutions.

- The percentage of journalists interested in writing about science in Tunisia reached 74.2%, while the remaining percentage, 25.7%, did not bother writing about science issues.

- The skills and capabilities of Tunisian journalists varied regarding the level and degree of mastery of the various skills of journalism, as follows: While the masses of Tunisian journalists master the traditional journalistic skills such as writing news stories, interviews, opinions, and investigation stories, at reasonable rates ranging from acceptable to excellence and mastery of these skills, even if the majority are to fall in the circle of average proficiency with a distinct few, but the majority of Tunisians are not good at producing multimedia, to varying degrees: 34.2% of Tunisian journalists are good at producing video, 28% can present video content on average, and 8.5% present it excellently, while 25.7 % are not good at the production of video journalism, and 2.8% of respondents are neutral in this regard.

- 42.8% of journalists in Tunisia are not good at producing podcasts, just as about 43% of Tunisia journalists are not good at producing infographics.
- Based on the previous result, 94% of the sample of journalists in Tunisia demand training in science journalism, 71.4% of journalists demand that training be focused on the production of multimedia content, while the remaining 25.7% demand training on features and investigative stories.

- Most journalists in Tunisia agree that Arabic should be the language of training, with a rate of 91.4%.

- Most of the journalists in Tunisia support that the training is face-to-face, but very close percentages of journalists also welcome online lectures, either in the form of integrated training or by focusing on a specific type of content such as podcasts or videos. A large percentage of journalists confirmed the suitability of the Internet and the quality of service in Tunisia to hold these training courses, while a minority of journalists, 2.8%, indicated poor internet service in Tunisia.

- 85.7% of the journalists agreed that there are no institutions providing training or a degree in science journalism, which reflects the urgent need for training courses in the skills and arts of producing scientific content in its various forms, especially the production of multimedia content.

- Journalists in Tunisia who were included in the study sample suggest that training programs to be designed to address: A basic introduction to science journalism, how to find and evaluate a potential science news story, how to present a science story idea to an editor, how to write a story based on a scientific research paper, how to write a story based on a press release, how to interview a scientist and how to write a story based on that interview, how to produce multimedia content to cover a science story, in addition to training in the production of scientific documentaries, and training in simplifying the media writing language for scientific issues.

2- Morocco

- In Morocco, of which 24 respondents joined the study, representing 11.1% of the total study sample, the percentage of youth in the age group from 21-35 reached 45.8%, while the percentage of middle-aged journalists in the age group from 36-50 was 50% and the remaining 4.2% for the over 50 age group.

- The male journalists constituted the predominant percentage of journalists who responded to the questionnaire in Morocco who work in science journalism and those interested in covering science and scientific issues, at a rate of 54.2% compared to 45.8% for females.

- Levels of experience in practicing science journalism in Morocco are 25% for those with junior expertise of one to three years of experience and the same percentage for those with professional experience of 4-6 years, and the same percentage for those with professional experience of 7-10 years, as well as those with experience of more than ten years. This rare equality means that Morocco enjoys a level of similar and diverse media expertise and all levels.

- Journalists in Morocco work in news websites and electronic platforms, at a rate of up to 50%, while about 37.5% of journalists work in media organizations that combine printed newspapers with digital platforms. In contrast, the lowest percentage of journalists work in printed newspapers only, and they constitute 12.5% of the total journalists who participated in the study from Morocco. This result reflects the journalists' knowledge in Morocco of online newspapers and digital platforms.

- Local coverage prevails over the geographical range of Moroccan newspapers, websites, and online platforms for public and science issues by the allegiance of 45.8%. In comparison, the regional coverage represents 37.5%, and finally international coverage by 16.7%, and this means that the predominant trend on Moroccan media institutions is for domestic and local coverage, and the exceptions in the science coverage are for the share of the regional and international, as is the case in Tunisia.

- The analytical study confirmed that the Arabic language is the predominant language for publishing on science and technology issues in Morocco at a rate of 95.8%. In comparison, the French language represents a rate of 4.2%, which is a result that makes adopting the Arabic language as a basis for training an indispensable option according to the opinion of the majority of Moroccan journalists.

- Most of the journalists in Morocco confirmed that their newspapers and digital platforms provide coverage of science issues at a rate of 95.8%, while 4.2% of the sample stated that their media work does not cover science issues.

- The results of the statistical analysis revealed the lack of interest in the scientific issues in the Moroccan media, as the predominant percentage was for the allocation of an irregular space whenever a scientific event or issue occurred at a rate of 41.7%, followed

by covering science in a specialized department or section, at a rate of 33.3%. In contrast, the remaining percentage, which is 25%, reflected the publication of scientific topics in the section of local and miscellaneous news, which means an improvement in the level of interest in publishing about various science issues in Moroccan media institutions to Tunisia.

- Moroccan media institutions provide coverage of science issues like health, environment, technology, and other issues daily at a rate of 45.8%, weekly by 20.8%, and monthly by 4.2%, which reflects the superiority of the Tunisian press in the periodical of regular publication on science-related issues.

- The challenges related to publishing about science issues are almost the same in most Arab countries included in this study. However, the differences in the percentages of these challenges and their entirety, as journalists in Morocco oppose viewing science as a dry content challenging to understand by a large percentage of 67.5%, while the impartiality on the same percentage of approval, which amounted to 16.7%. This reflects the belief of the vast majority in the vitality of scientific content and the possibility of simplifying it for the public.

- It seems that the difficulty of communicating with scientists and researchers is a real problem existing in Morocco, like the rest of the Arab countries included in this study, as more than 45.8% of journalists in Morocco approved of this problem and 25% stood by the impartiality, while 29.2% of the sample of journalists denied the existence of this problem. In conclusion, the problem of accessing specialized scientific resources and making them available to journalists interested in covering science issues represents one of the most critical challenges of scientific journalism in Morocco.

- Like the rest of the Arab countries, Morocco suffers from the lack of specialized journalists who can cover science issues, with an approval rating of 91.8%. At the same time, those who stood on the neutrality of this problem and denied this problem as an obstacle to the practice of specialized science journalism is a small percentage of Moroccan journalists amounted only 8.2% of the total sample.

- More than 63.3% of the journalists in Morocco who responded to this questionnaire agreed that newspapers and media institutions' policies do not care about covering science issues. In comparison, about 25% of the journalists stood on impartiality, and 12.5% of the journalists in Morocco rejected the existence of this problem.

- 47% of Morocco journalists reject the view that science and scientific issues do not receive readers' attention, while 37.5% stand neutral, and only 16.7% support this statement.

- 87.5% of the study sample agrees that there is a weakness in training and capacity building of science editors or those journalists interested in covering science in Morocco, while 12.5% of the sample stands on the impartiality of this matter. This means that there is a real problem in the availability of training related to science journalism in Morocco.

- About 70.9% of the journalists surveyed reported the existence of media institutions, newspapers, or websites that cover science in Morocco, and the remaining 29.1% saw the absence of these distinguished institutions.

- The percentage of those interested in writing about science in Morocco is 100%, which is a large percentage that means high awareness of the importance of this type of specialized journalism.

- The skills and abilities of Moroccan journalists varied concerning the level and degree of their mastery of the various skills of journalism, as follows: While the masses of journalists master the traditional journalistic skills such as writing news stories, interviews, opinions, and investigative stories, at reasonable rates ranging from acceptable to excellence and mastery of these skills, although the majority fall In the circle of average proficiency with a distinct few, however, the majority of Moroccan journalists are not good at producing multimedia, to varying degrees: 29.2% of Moroccan journalists are good at producing video while 33.3% are not good at producing podcasts, and about 62.5% of journalists in Morocco are not good at producing Infographics.

- Based on the previous result, 100% of the sample in Morocco demand specialized training in science journalism, 66.7% of journalists require that training be focused around the production of multimedia content, while the remaining 33.3% demand training in conducting features and investigative stories.

- Most journalists in Morocco agree that Arabic is the language of training, at a rate of 91.7%. In comparison, the remainder of 8.3% demands that French be a language of training.

- Most of the journalists interested in covering science issues in Morocco support the training being face-to-face by 88%. However, very close percentages of journalists also welcome online training, either in the form of integrated lectures or through podcasts or videos, especially since a large percentage of journalists confirmed the suitability of the

Internet and the quality of service in Morocco to hold these training courses at a time when a minority of journalists, 4.2%, indicated poor Internet service in Morocco.

- 100% agreed that there are no institutions providing training or a degree in the field of science journalism, which reflects the urgent need for training courses in the skills and art of producing scientific content in its various forms, especially the production of multimedia content.

- Journalists in Morocco who were included in the study sample suggest that the training programs should address:

- Translating scientific terms and simplifying them to work with them in the article, the research hypothesis in scientific investigations and how to analyze numbers and data in data journalism, acquiring more skills related to the digital field that has now become inevitable, the skills of attracting the reader to science issues, in addition to an introduction for basic science journalism, how to find and evaluate a potential science news story, how to present a science story idea to an editor, how to write a story based on a scientific research paper, how to write a story based on a press release, how to interview a scientist and how to write a story based on that interview, how to produce multimedia content to cover science story.

3- Libya

- In Libya, from which 23 respondents joined the study, representing 10.6% of the total study sample, the percentage of youth in the age group from 21-35 reached 69.6%, while the percentage of middle-aged journalists in the age group from 36-50 reached 21.74%, and the rate of 8.7% for the age group over 50 years of age.
- The male journalists constituted the predominant percentage of journalists who responded to the questionnaire in Libya who work in science journalism and those interested in covering science issues, at 87% compared to 13% for female journalists.

- Levels of experience in practicing science journalism in Libya were equal, with 17.4% for those with junior expertise of one to three years of experience and 21.7% for those with professional experience of 4-6 years, and for those with 7-10 years of professional expertise 34.8% for those with Experience exceeding ten years, reaching 26%.

- Journalists in Libya work for media platforms that combine printed and digital platforms together at a rate of 56.5%, while about 39.1% of journalists work in media organizations that only have digital platforms. In contrast, the lowest percentage of journalists work in printed newspapers. They only constitute 4.4% of the total number of journalists studied in Libya, and this result reflects the knowledge of journalists in Libya about digital platforms and printed paper newspapers alike, even if digital media prevail.

- Local coverage prevails over the geographical range of Libyan newspapers and digital platforms for public and science issues by 52.2%, while the regional coverage represents 26.1%, and finally international coverage by 21.7%. This means that the predominant trend on Libyan media platforms is the domestic issues, and the exceptions in the scientific coverage are of the share of the regional and international domains, as is the case in Tunisia and Morocco.

- The analytical study confirmed that the Arabic language is the dominant language for publishing about science issues in various Libyan media platforms, at a rate of 95.7%. In comparison, the English language represents 4.3%, which is a result that makes the adoption of the Arabic language for training an indispensable option according to the opinion of the majority of journalists.

- The majority of journalists in Libya confirmed that their newspapers and digital platforms provide coverage of the scientific affairs and its issues, at a rate of 65.2%, while 17.4% of the sample went to the fact that their media platforms do not cover the scientific issue, while the same percentage 17.4% confirmed that they were providing science coverage and stopped.

- Like the Tunisian and Moroccan newspapers, the statistical analysis results revealed the lack of interest in science coverage in the Libyan media. The predominant percentage was for irregular publication by allocating an irregular space whenever a scientific event or issue occurred. It amounted to 43.5%, followed by publishing science issues coverage in the domestic and miscellaneous news section at a rate of 26.1%, then publishing with unspecified periodical or space at 20.7%.

- Libyan media institutions provide coverage of scientific issues like science, health, environment, technology, and other issues irregularly in line with the previous result at a rate of 39.1%, and weekly by 34.9%, and on unspecified periodical by 13%. In comparison, Science Publishing does not exceed 13%.

- The challenges related to publishing about science issues are almost the same in most Arab countries included in this study. However, the differences in the percentages of these

challenges and their entirety, as journalists in Libya oppose looking at science as dry content that is difficult to understand by 37.8%. This matter is neutral for 26.2%, while 36% of journalists in Libya support the existence of this challenge.

- It seems that the difficulty of communicating with scientists and researchers is a real problem existing in Libya, like the rest of the Arab countries included in this study, as more than 60.8% of journalists in Libya approved the existence of this problem and stood by the impartiality 34.8% of the sample of journalists, while 4.4% of the study sample denied the existence of this problem. In conclusion, accessing specialized scientific resources and making them available to serve journalists interested in covering science issues is one of the most critical challenges of science journalism in Libya, as are Tunisia and Morocco.

- Like the rest of the Arab countries, Libya suffers from the lack of specialized journalists who can cover science issues, with an approval rate of 73.9%, while 17.4% of the journalists in Libya denied this challenge and stood by the impartiality of the matter only 8.7% of the total sample.

- More than 78.3% of the journalists in Libya who responded to this questionnaire agreed that media institutions' policies do not care about covering science issues, while about 17.4% of the journalists stood on impartiality. Only 4.3% of the journalists in Libya rejected the existence of this problem.

- 39.1% of journalists in Libya reject the view that science issues do not receive readers' attention, while 34.8% of this matter stands neutral, while 26.1% of Libyan journalists support this statement.

- The majority of Libyan journalists included in this questionnaire deny that there is a lack of training and qualification of scientific editors or those interested in covering science in Libya, at a rate of 78.2%. In comparison, 17.4% of journalists stood on the impartiality of this matter, and the remaining 4.4% rejected the lack of qualification and training aspects for journalists.

- About 82.6% of the journalists who joined the study stated that there are no media institutions that cover science in Libya, and the remaining 17.4% saw the existence of these institutions distinguished for their science coverage in Libya.

- The percentage of those interested in writing about science in Libya reached 60.9%, which is a reasonable percentage that means awareness of the importance of this type of specialized journalism. In comparison, 39.1% of the Libyan journalists who responded to the questionnaire expressed their lack of interest in science writing.

- The skills and capabilities of Libyan journalists varied concerning the level of their mastery of the various journalism skills as follows: As the masses of journalists master the traditional journalistic arts such as writing news stories, interviews, opinions, and investigation stories at reasonable rates ranging from acceptable to excellence and mastery of these skills. In Tunisia and Morocco, the majority fell into the circle of distinguished proficiency, while a negligible percentage, representing 4.3% of journalists, remained in the process of not having any knowledge of these journalistic skills. However, most Libyan journalists are not proficient in multimedia production, to varying degrees: 30% of journalists are not professional in video production while 34.8% are not good at producing podcasts, and about 60.9% of journalists in Libya are not good at producing infographics.

- Based on the previous result, 95.7% of the sample of journalists in Libya demand specialized training in science journalism, and 52.2% of journalists demand that training be focused around the production of multimedia content, while the remaining 47.8% demand training in writing features and investigative stories.

- Most of the journalists in Libya agree that Arabic is the language of training, with a rate of 91.3%. At the same time, the remaining 8.7% calls for English to be the language of training.

- Most of the journalists interested in covering science issues in Libya support that the training is face-to-face with a rate of 77.8%. At the same time, very close percentages of journalists also welcome online lectures, either in the form of integrated training or by focusing on a specific type of content such as through podcasts or videos, especially as a large percentage of journalists confirmed the quality of the Internet service in Libya to hold these training courses. In contrast, a minority of journalists, 17.3%, indicated poor Internet service in Libya, so it cannot be relied upon.

- 87% agreed that there are no Libyan institutions offering training or a scientific degree in the field of science journalism. In comparison, the remaining 13% indicated such institutions' existence, which is a weak percentage, reflecting the urgent need for training courses in the skills and arts of producing scientific content in its various forms, especially Multimedia content production.

- Journalists in Libya who were included in the study sample suggest the design of training programs that address: a basic introduction to science journalism, how to find and evaluate a potential science story, how to present a science story idea to an editor, how to write a story based on a scientific research paper, how to write a story based on a press release,

how to interview a scientist and how to write a story based on that interview, how to produce multimedia content to cover a story.

4- Algeria

- In Algeria, from which 20 respondents underwent field study, representing 9.2% of the total study sample, the percentage of youth in the age group from 21-35 reached 75%, while the percentage of middle-aged journalists in the age group from 36-50 reached 20% and the remaining 5% for the age group over 50 years old.

- The male journalists constituted the predominant percentage of journalists who responded to the questionnaire in Algeria, who work in science journalism, and those interested in covering science issues, at a rate of 80% compared to 20% for female journalists. This reflects a numerical superiority in the number of working males and those interested in science journalism compared to the small number of females.

- The levels of experience in practicing science journalism in Algeria varied, so that the majority of those who responded to this questionnaire at a rate of 65% have experience of one to three years, and for those with more than 10 years' experience, their percentage reached 15%, and the percentage is equal for those with professional expertise From 4-6 years and 7-10 years, and it was 10% for each.

- Approximately 65% of the journalists work in media organizations that publish on digital platforms, while journalists in Algeria work in media institutions that combine printed newspapers and digital platforms are up to 30%. The least percentage of journalists work in printed newspapers. They are only 5% of the total number of journalists studied in Algeria, and this result reflects the journalists' familiarity in Algeria with digital platforms and printed newspapers alike.

- The local coverage prevails over the geographical scope of Algerian media platforms' coverage for public and science issues with allegiance by up to 45%. In comparison, the regional coverage represents 35%, and finally the international coverage by 20%, and this means that the predominant trend on Algerian media institutions is the domestic coverages and that the exceptions in science coverage are of the share of the regional and international domains, as is the case in Tunisia, Morocco, and Libya.

- The analytical study confirmed that the Arabic language is the predominant language for publishing about science issues on Algerian media platforms at a rate of 100%, which is a result that makes adopting the Arabic language as a basis for training an indispensable option according to the opinion of the majority of journalists in Algeria, and of course this percentage is quite close. With the rest of the Arab Maghreb countries.

- Most of the journalists in Algeria confirmed that their platforms provide coverage of science and its issues at a rate of 95%, while 5% of the sample went to the point that their media platforms were providing science coverage and stopped.

- Like the Tunisian, Moroccan, and Libyan media platforms, the results of the statistical analysis revealed the lack of interest in the science issue in the Algerian media; the predominant percentage was for allocating an irregular space whenever a scientific event or issue occurred, at a rate of 40%, followed by the publication of science coverage in the section on internal and miscellaneous news, at a rate of 35%. In comparison, the remaining percentage was the share of publishing about science in a specialized section at a rate of 25%.

- Algerian media institutions provide coverage of scientific issues like science, health, environment, technology, and other issues on an irregular basis, consistent with the previous result, at a rate of 65%, daily by 20%, and weekly by 10%, and an unspecified periodical publication of 5%.

- The challenges related to publishing about science issues are almost the same in most Arab countries included in this study. However, the differences in the percentages of these challenges and their entirety, as journalists in Algeria oppose viewing science as dry content, are difficult to understand by up to 55%. This matter is neutral by 35%, while 10% of Algeria journalists support the existence of this challenge.

- 35% of the sample of journalists in Algeria are on the impartiality of the difficulty of communicating with scientists and researchers, while the same 35% opposes the existence of this problem, and 30% of journalists in Algeria support the existence of this problem.

- Like the rest of the Arab countries, Algeria suffers from the lack of specialized journalists who can cover science issues, with an approval rate of 75%, while rejecting this challenge and denying its existence 25% of journalists in Algeria from the total sample.

- 55% of journalists in Algeria who responded to this questionnaire agreed that media institutions' policies are not interested in covering science issues, while 45% of journalists in Algeria rejected the existence of this problem.

- 40% of Algeria journalists support the view that scientific issues do not enjoy the readers 'interest, while 35% stand neutral to this matter, while 25% of Algerian journalists oppose this statement.

- All the Algerian journalists included in this questionnaire support the lack of training and qualification of science editors or those interested in covering science in Algeria, at a rate of 65%. In comparison, 25% of journalists stood on the impartiality of this matter, and the remaining 10% rejected a weakness in the aspects of training of science editors.

- 70% of the journalists who joined the study stated that there are no media institutions specialized in covering science in Algeria, and the remaining 30% saw the existence of these institutions distinguished by their science coverage in Algeria.

- The percentage of those interested in writing about science in Algeria reached 85%, which is a large percentage that reflects an interest in this type of specialized journalism, while 15% of journalists who responded to the questionnaire expressed their lack of interest in writing about science.

- The skills and capabilities of Algerian journalists varied about the level and degree of mastery of the various journalistic skills as follows: As all journalists master the traditional journalistic skills such as writing news stories, interviews, opinions, and investigation stories, at reasonable rates ranging from acceptable to excellence and mastery of these skills, while the percentage remained between 5-10% of journalists do not possess these journalistic skills. However, a large percentage of Algerian journalists are not good at multimedia production, to varying degrees: 30% of journalists are not good at producing video, while 40% are not good at producing podcasts, while about 50% of journalists in Algeria are good at producing infographics, which makes training in multimedia content production in Algeria and other similar countries an urgent necessity.

- Based on the previous result, 90% of the sample of journalists in Algeria demand specialized training in science journalism, and 65% of journalists demand that training be focused around the production of multimedia content, while 30% demand training in writing features and investigative stories. The remaining 5% stand on neutrality.

-80% of journalists in Algeria agree that Arabic should be the language of training, while the remaining 15% demand that English be the language of training, and 5% of journalists did not specify the language.

- Most of the journalists interested in covering science issues in Algeria support the training being face-to-face by 90%, while 65% of journalists welcome online lectures, either

in the form of integrated training through different content types such as videos or podcasts. A large percentage of journalists confirmed the quality of the Internet service in Algeria for holding these training courses, when a few journalists, 5%, indicated that the Internet service in Algeria is low and cannot be relied upon.

- 85% unanimously agreed that there are no Algerian institutions offering training or a scientific degree in the field of science journalism. In comparison, the remaining 15% indicated such institutions' existence, which is a weak percentage, reflecting the urgent need for training courses in the skills and arts of producing scientific content in its various forms, especially multimedia content production.

- Journalists in Algeria who were included in the study sample suggest to design training programs that address: Multimedia content production, followed by training in writing features and investigative stories.

5- Mauritania

- In Mauritania, from which 13 respondents responded to the questionnaire, representing 6% of the total study sample, the percentage of youth in the age group from 21-35 reached 61.54%, while middle-aged journalists in the age group from 36-50 was 38.46%.

- The male journalists constituted the predominant percentage of journalists who responded to the questionnaire in Mauritania who work in science journalism and those interested in covering science issues, at a rate of 53.8% compared to 46.2% for female journalists. This reflects a numerical superiority in the number of working males and those interested in Algeria Science journalism compared to a smaller number of females.

- The levels of experience in practicing scientific media in Mauritania varied, so that the majority of those who responded to this questionnaire at a rate of 53.8% had an experience of one to three years, and those with professional experience of 4-6 years were 30.8%, while those with more experience than 10 years, their percentage reached 15.4%.

- 84.6% of the journalists in Mauritania work for media organizations that publish on digital platforms. In contrast, journalists in Mauritania work in media institutions that combine printed publications and newspapers, and digital platforms together by 15.4%, and this

result reflects the knowledge of journalists in Mauritania with both printed and digital media.

- Local coverage prevails over the geographical range of coverage of media platforms in Mauritania for public and science issues by up to 53.8%. In comparison, the percentage of international coverage represents the remaining 46.2%. This means that the predominant trend on Mauritanian media institutions is the domestic trend and that the exceptions in science coverage are for the regional and international coverage is the case in all countries of the Maghreb.

- The analytical study confirmed that the Arabic language is the predominant language for publishing about science issues in Mauritanian media platforms, at a rate of 100%, which is a result that makes the adoption of the Arabic language a base for training an indispensable option according to the opinion of the majority of journalists in Mauritania, and of course this percentage is quite close with Tunisia and Algeria.

- A large percentage of journalists in Mauritania confirmed that their newspapers and digital platforms provide coverage of scientific issues, at a rate of 76.9%. In comparison, 15.4% of the sample reported that their media businesses had not previously offered scientific coverage, while the remaining 7.7% used to have science coverage but stopped.

- The results of the statistical analysis revealed the lack of interest in science issues in the Mauritanian media, as the predominant percentage is for irregular publication through the allocation of an irregular space whenever a science event or issue occurred, at a rate of 46.2%, followed by the publication of science coverage in a specialized section with 23%, then publishing in the internal and miscellaneous news section by 15.4%.

- As for the periodical of publishing science-related issues, the Mauritanian media institutions provide coverage of science issues like science, health, environment, technology, and other issues irregularly in line with the previous result by 38.5%, monthly by 23%, and daily by 15.4%, while publishing weekly at the same rate of 15.4%.

- The challenges related to publishing about science issues are almost the same in most Arab countries included in this study. However, the differences are in the percentages of these challenges and their entirety, as journalists in Mauritania oppose viewing science as dry content that is difficult to understand by up to 38.4%, and neutral to this matter by 30.8%. In comparison, this challenge's existence is supported by the same 30.8% of journalists in Mauritania.

- 46% of journalists in Mauritania support the existence of difficulty in communicating with scientists and researchers, and 30.8% stand on this issue's impartiality, while 23.2% oppose the existence of this challenge.

- 54% of journalists in Mauritania agree that there is a shortage of specialized journalists who can cover scientific topics, while the percentage of those who rejected this statement or stood by the neutrality of it is 23% for each of the two categories.

- 69.1% of the journalists in Mauritania who responded to this questionnaire agreed that media institutions' policies do not care about covering science issues, while 30.9% of the journalists rejected the existence of this problem.
54.4% of journalists in Mauritania support considering that science issues do not receive readers' attention, while 35% stand on neutrality to that matter and 10,6% of journalists oppose this statement.

- Most of the journalists in Mauritania included in this questionnaire support the lack of training and qualification of science editors or those interested in covering science in Algeria, at a rate of 76.9%. In comparison, 15.4% of journalists oppose this, and 7.7% of journalists are neutral in this matter.

- 76.9% of the journalists' understudy said that there are no media institutions that specialized in covering science in Mauritania, and the remaining 23.1% saw the existence of these institutions distinguished for their scientific coverage in Mauritania.

- The percentage of those interested in writing about science in Mauritania was 84.6%, which is a large percentage that reflects an interest in this type of journalism, while 15.4% of the journalists who responded to the questionnaire expressed their lack of interest in science writing

- The skill levels and capabilities of journalists in Mauritania regarding the level and degree of their mastery of journalism skills represent a unique case in the Maghreb countries, as 30.8% are not proficient in writing features. The level of journalistic skills proficiency ranges from acceptable to good. However, a large percentage of journalists in Mauritania are not good at producing multimedia as 46.1% of journalists are not good at producing video, 69.2% are not good at producing podcasts, and about 69.2% of journalists are not good at producing infographics, which does training in producing multimedia content in Mauritania like the rest of the countries, is a necessity.

- Based on the previous result, 100% of the sample journalists in Mauritania demand specialized training in science journalism, 84.7% of journalists demand that the training be

focused around the production of multimedia content, while 15.3% demand training in writing features and investigative stories.

- 100% of journalists in Mauritania agree that Arabic should be the language of training.

- 61.4% of science journalists and those interested in covering science issues in Mauritania support that the training should be face-to-face, while 38.6% accept training online, whether the training comes in the form of integrated training through other types of content like videos or podcasts. Especially since many journalists, 61.6%, confirmed the quality of the internet service in Mauritania to hold these training courses, while 30.8% indicated poor internet service in Mauritania, and 7.7% of journalists said that it is not possible to rely on.

- 92.3% agreed that there are no institutions in Mauritania that offer training or academic degrees in science journalism. In comparison, the remaining 7.7% indicated such institutions' existence, which is a weak percentage that reflects the urgent need for training courses in the skills and arts of producing scientific content in its various forms– especially multimedia content production.

- Journalists in Mauritania who were included in the study sample suggest that training programs be designed to address: a basic introduction to science journalism, how to find and evaluate a potential science story, how to write a news story based on a scientific research paper, how to produce multimedia content to cover a science story.

6- Lebanon

- In Lebanon, from which 26 respondents responded to the questionnaire, representing 12% of the total study sample, the percentage of youth in the age group from 21-35 reached 73.1%, while the percentage of middle-aged journalists in the age group of 36-50 was 23%, while the percentage of those over 50 reached 3.9%.

- The female journalists constituted the predominant percentage of journalists who responded to the questionnaire in Lebanon who work in science journalism and those interested in covering science issues, at a rate of 76.9% compared to 23.1% for males. This reflects a numerical superiority in the number of working females in science journalism versus males.

- The levels of experience in practicing science journalism in Lebanon varied, where the percentage of those who responded to this questionnaire among the beginners was 19.2%, and they had one to three years of experience, those with professional experience of 4-6 years were 30.8%, and those with experience of 7 -10 years were 19.2%. Those with more than 10 years of experience were 30.8%.

- 65.4% of journalists in Lebanon work for media organizations that publish on digital platforms. In comparison, journalists working for media institutions that combine printed publications with online platforms are 30.8%. In contrast, the lowest percentage of Lebanese journalists' sample works in printed publications. This result reflects the familiarity of journalists in Lebanon with digital platforms and print publications alike.

- The local coverage prevailed over the geographical range of coverage of different media platforms in Lebanon for public and science issues by 38.5%. In comparison, the regional coverage represented 34.6%, and the international coverage was the remaining 26.9%, which means that the prevailing trend on media platforms are for domestic coverages, and the exceptions in science coverage are for the share of the regional and international bands.

- The analytical study confirmed that the Arabic language is the predominant language for publishing on issues of science with a rate of 96.1%, and the remaining 3.9% was for the English language, which is a result that makes the adoption of Arabic as a basis for training an indispensable option according to the opinion of the majority of journalists in Lebanon, of course, this percentage is entirely close to its counterparts in most Arab countries included in the study.

- A large percentage of journalists in Lebanon confirmed that their newspapers and digital platforms provide coverage of science issues, at a rate of 77%, while 11.5% of the sample went to the fact that their media platforms did not provide science coverage, and the same percentage 11.5%, was for platforms that used to cover science issues but stopped.

- The statistical analysis results revealed the interest in covering science issues in the Lebanese media, as the predominant percentage was for publication that allocating a fixed and regular section to cover science issues at a rate of 42.3%. In contrast, the irregular publication through the allocation of Irregular space whenever a science event or issue occurred, it came with a rate of 34.6%, followed by the publication of science coverage in the section of internal and miscellaneous news by 19.2%.

- In terms of publishing periodical coverage on science issues, Lebanese media institutions cover science issues like science, health, environment, technology, and others irregularly,

consistent with the previous result, at a rate of 38.5%, weekly by 30.8%, and daily by 23%, and by 3.8% monthly.

- The challenges related to publishing about science issues are almost the same in most Arab countries included in this study. However, the differences in the percentages of these challenges and their entirety, as journalists in Lebanon oppose viewing science as dry content difficult to understand by up to 36.2%. And journalists are neutral to this matter by 30.8%, while 23% of journalists in Lebanon support this challenge.

- 50% of journalists in Lebanon support the existence of difficulty communicating with scientists and researchers, while 26.9% oppose the existence of this challenge and 23.1% stand for impartiality on this issue.

- All journalists in the study sample with 100% in Lebanon agree that few specialized journalists can cover science issues. This is a result that is unique to Lebanon in affirming this challenge as a significant obstacle to serious and sustainable science journalism, and it is a result that reflects the necessity of training and capacity building in science journalism skills on a large scale in Lebanon and other Arab countries.

- 76.9% of the journalists in Lebanon who responded to this questionnaire agreed that media institutions' policies are not caring about covering science issues. In comparison, 11.6% of journalists rejected this problem's existence, and 11.5% stood by this matter's impartiality.

- The statement that science issues do not receive readers' attention is opposed to a rate of 42.4% of journalists, while 34.6% of journalists in Lebanon supported it, and 23% were neutral to the matter.

- The majority of Lebanon's journalists included in this questionnaire support the lack of training and qualification of science editors or those interested in covering science in Lebanon, at a rate of 84.6%. In comparison, 7.7% of journalists oppose this, and 7.7% of journalists stand neutral in this matter.

- 61.6% of the journalists who joined the study said that no media institutions are specializing in covering science in Lebanon, and the remaining 38.4% saw the existence of these institutions distinguished by their science coverage in Lebanon.

- The percentage of those interested in writing about science in Lebanon reached 88.5%, which is a large percentage that reflects an interest in this type of specialized journalism,

while 11.5% of the journalists who responded to the questionnaire expressed their lack of interest in writing about science.

- The skill levels and capabilities of journalists in Lebanon regarding the level and degree of their mastery of journalism skills are unique cases in the Levant countries, as the majority are average in writing news reports and investigative stories. However, there is a percentage of journalists in Lebanon who are not proficient in producing multimedia. Close proportions: 23% of journalists are not good at producing video, 53.9% are not good at producing podcasts, and about 53.9% of journalists are not good at producing infographics, which does training in the production of multimedia content in Lebanon and the rest of similar countries a necessity.

- Based on the previous result, 92.3% of the sample of journalists in Lebanon demand specialized training in science journalism, and the same 92.3% of journalists demand that training to be focused around the production of multimedia content, and 96.1% of journalists in Lebanon chose Arabic to be the language of training.

- 73% of journalists interested in covering science issues in Lebanon support the training being face-to-face. In comparison, the percentages of those who accept training in online lectures outnumber those who oppose whether the training comes in the form of integrated training by 54% or using a specific type of content such as podcasts or videos by 60.9%, especially since a large percentage of journalists confirmed the quality of the Internet service in Lebanon for holding these training courses at a time when a minority of journalists 7.6% indicated poor internet service in Lebanon, and 3.8% of journalists said that it could not be accredited for online training in Lebanon.

- 88.5% agreed that there are no institutions in Lebanon that offer training or academic degrees in the field of scientific media. In comparison, the remaining 11.5% indicated such institutions' existence, which is a weak percentage that reflects the urgent need for training courses in the skills and arts of producing scientific content in its various forms– especially multimedia content production.

- Journalists in Lebanon who were included in the study sample suggest that training programs be designed to address: How to present a scientific, journalistic material that attracts the recipients' attention and facilitates their understanding of pressing scientific issues, Also methods to simplify complex scientific information to target the largest segment of the public, what are the scientific sources that can be relied upon, how to find and evaluate a potential scientific news story, How to write a news story based on a scientific research paper, How to produce multimedia content to cover a science story, a basic introduction to science journalism.

7- Iraq

- In Iraq, of which 23 respondents responded to the questionnaire, representing 10.7% of the total study sample, the percentage of youth in the age group from 21-35 reached 43.5%, while the percentage of middle-aged journalists in the age group of 36-50 reached 39.1%, and the percentage of those over 50 reached 17.4%.

- The male journalists constituted the predominant percentage of journalists who responded to the questionnaire in Iraq who work in science journalism and those interested in covering science issues, at a rate of 62.2% compared to 34.1% for female journalists. This reflects a numerical advantage in the number of working males and those interested in science journalism versus females.

- The levels of experience in practicing scientific media in Iraq varied, but the majority of those with long experience spanning more than ten years and their percentage reached 43.5%, followed by those with medium experience from 4-6 years at a rate of 30.4%, then beginners by 21.7% and they have experience of one year for three years, the percentage of those with experience of 7-10 years was 4.3%.

- 52.1% of journalists in Iraq work for media organizations that publish on digital platforms. In contrast, journalists who work in media institutions combine printed publications and digital platforms together by 39.1%. In comparison, the lowest percentage of Iraqi journalists' sample works in printed publications at a rate of 8.7%. This result reflects the awareness of journalists in Iraq with both digital platforms and printed publications alike.

- The local coverage prevailed over the geographical range of coverage of different media platforms in Iraq for public and science issues by 43.8%. In comparison, the regional coverage rate represented 34.8%, and the international coverage by the remaining 17.4%, which means that the prevailing trend on Iraq's institutions is domestic coverage, and it is a frequent finding in most Arab countries that were subject to this study.

- The analytical study confirmed that the Arabic language is the predominant language for publishing about science issues in Iraqi platforms at a rate of 100%, which is a result that makes adopting the Arabic language as a basis for training an indispensable option according to the opinion of the majority of journalists in Iraq, and of course this percentage is quite close with their counterparts in most Arab countries included in this study.

- A large percentage of journalists in Iraq confirmed that their platforms provide coverage for science issues at a rate of 69.6%, while 21.7% of the sample went to the fact that their

media institution did not provide scientific coverage, and the rate came to 8.7% for platforms that used to cover science but stopped.

- The results of the statistical analysis revealed the interest in science coverage in the Iraqi media, as the percentage of publishing science coverage under the section of internal and miscellaneous news is equal to the percentage in the case of irregular publication by allocating an irregular space whenever an event occurs or a scientific issue, which came at a rate of 34.8% for each of them separately, and Iraqi media platforms devote a fixed section at a rate of 26.1%.

- As for the periodical for publishing on science issues, Iraqi media institutions provide coverage of science issue in terms of science, health, environment, technology, and other issues irregularly in line with the previous result at a rate of 39.1%, weekly by 21.7% and daily by 30.4% Monthly publishing rate of 4.3%.

- The challenges related to publishing about science issues are almost the same in most of the Arab countries included in this study, but the differences in the percentages of these challenges and their entirety, as journalists in Iraq support looking at science as dry content that is difficult to understand by 42.2%. 30.4% were neutral to that matter, while this challenge is opposed by a percentage of journalists in Iraq, which stands at 17.4%.

- 73.8% of journalists in Iraq support the existence of difficulty in communicating with scientists and researchers, while 13.1% oppose the existence of this challenge, and 13.1% of the total sample of journalists in Iraq stands on the impartiality of this issue.
- Most of the journalists in the study sample in Iraq agree that few specialized journalists can cover science topics by 91.2%. In contrast, the percentages of those who reject the existence of this obstacle are equal to those who stood neutral, at a rate of 4.3% for each of them separately, which is a result that reflects the need for training and qualification in the skills of scientific journalism on a large scale in Iraq and other Arab countries.

- The policies of the Iraqi media institutions and the extent of their standing as an obstacle to the scientific media, 78.3% support the existence of this challenge while 17.4% of journalists stand neutral, and 4.3% of the journalists oppose this.

- The result of the journalists 'approval of the statement that science and scientific issues do not receive the readers' interest in the same proportion was the rejection of 26% for each of them separately, while the vast majority of the sample stood by the neutrality of this saying, at a rate of 47.9%.

- The majority of journalists in Iraq included in this questionnaire support the lack of training and qualification of science editors or those journalists interested in covering science in Iraq, at a rate of 82.6%, and journalists oppose this matter and stands on the impartiality of the same percentage at 8.7 for each.

- 95.6% of the journalists who joined the study said that no media institutions are specializing in covering science in Iraq, and the remaining 4.4% saw the existence of these institutions distinguished for their scientific coverage in Iraq.

- The percentage of those interested in writing about science in Iraq reached 60.9%, which is a large percentage that reflects the interest in this type of specialized press, while 30.1% of journalists who responded to the questionnaire expressed their lack of interest in writing about science.

- The skill levels and capabilities of journalists in Iraq vary about the level and degree of their mastery of the journalism skills, as they are good at writing news reports, investigative stories, and features, with a degree of good for the average of a large percentage of journalists in Iraq and with a distinct few, but it is striking in the sample of Iraqi journalists that a large proportion of those surveyed 34.8% is not good at writing articles or 26% of reporting. However, the largest percentage of Iraqi journalists are not good at producing multimedia: 56.5% of journalists are not good at producing video, 73.9% are not good at producing podcasts, and about 69.6% are not good at producing infographics, which makes training in multimedia content production in Iraq and the rest of the sample countries an urgent necessity.

- Based on the previous result, 87% of the sample in Iraq demand specialized training in science journalists, and 52.2% of journalists demand that training be focused around the production of multimedia content, and 39.1% of journalists demand training in writing features and investigative stories.

- 82.2% of journalists in Iraq agree that Arabic is the language of training and 8.7% agree that English is the language of training, and the same percentage did not specify the language of training that they want.

- 95.7% of science journalists and those interested in covering science issues in Iraq support the training being face-to-face, so more than 39% are against holding lectures via the Internet, while more than 30% agree to it and the remaining percentage is dispersed between standing on neutrality or not defining the courses, and the truth is that the repercussions of the Corona pandemic, which locked humanity in a forced quarantine, varying between total and partial, created an excellent desire for movement, exit and

travel, and with the blurring of the announced position of vaccines, the views of people and the opinions of the sample of respondents confused between physical and virtual training, and 45% of journalists oppose Iraqi online lectures through podcasts and 48% of them oppose integrated training via the Internet, a case unique to the State of Iraq by comparison with the previous six countries, and the last result is justified, especially since a large percentage of journalists confirmed poor Internet service in Iraq to hold these training courses, at a rate of 60.1%. 17.4% of Iraqis say they cannot rely on the Internet at all in Iraq.

- The complete sample of Iraqis agreed by 100% that there are no institutions in Iraq that offer training or a degree in the field of scientific media. This result reflects the urgent need for training courses in the skills and arts of producing scientific content in its various forms, especially the production of multimedia content in Iraq.
- Journalists in Iraq who were included in the study sample suggest that you design training programs that address: Data journalism is important in the work of a science journalist, training of media professionals, then a basic introduction to science journalism, how to find and evaluate a potential scientific news story, how to present an idea of a scientific news story to an editor, how to write a story based on a scientific research paper, how to write a story based on a press release, how to interview a scientist and how to write a story based on that interview, how to produce multimedia content to cover a science story.

8- Jordan

- In Jordan, of which 23 respondents responded to the questionnaire, representing 10.7% of the total study sample, so the percentage of youth in the age group of 21-35 reached 56.5%, while the percentage of middle-aged journalists in the age group of 36-50 reached 39.1%, while the percentage of over 50 people is about 4.3%.

- The male journalists constituted the predominant percentage of journalists who responded to the questionnaire in Jordan who work in science journalism and those interested in covering science and science issues, at a rate of 56.5% compared to 43.5% for female journalists. This reflects a numerical advantage in the number of working males and those interested in science journalism versus females.

- The levels of experience in practicing scientific media in Jordan varied, but the predominance of beginners from 1-3 years of experience is 43.5%, followed by those with

long experience spanning more than ten years and their percentage reached 34.8%, followed by those with medium experience from 7-10 with a rate of 13.4%, and as for those with experience from 4-6 years, their percentage was 8.7%.

- 47.8% of Jordan journalists work in media organizations that combine printed publications and digital platforms together, while 34.8% work in organizations that publish on digital platforms. The lowest percentage of the sample of Jordanian journalists work in printed publications, which is 17.4%. This result reflects the knowledge of journalists in Jordan about digital platforms and printed publications alike.

- Local coverage prevails over the geographical range of coverage of the different Jordan platforms for public and science issues by 60.9%. In comparison, the regional coverage represents 20.1%, and international coverage with the remaining 13%, which means that the prevailing trend on media institutions is the domestic coverage, most often in science issues, and it is a frequent finding in most of the Arab countries that have been subject to this study.

- The analytical study confirmed that the Arabic language is the predominant language for publishing about science issues at a rate of 95.7%. In comparison, English represents only 4.3%, which is a result that makes adopting Arabic as a basis for training an indispensable option according to the opinion of the majority of journalists in Jordan; of course, this percentage is entirely close to its counterparts in most Arab countries included in this study.

- A large percentage of journalists in Jordan confirmed that their media platforms provide coverage of science issues, at a rate of 82.6%, while 13% of the sample went to the fact that their media platform did not provide scientific coverage before, and the percentage came to 4.4% that used previously to present science coverage and stopped.

- The results of the statistical analysis revealed the interest in covering science issue in the Jordanian media, as the prevalence of the dissemination of science and its issues within the internal and miscellaneous news section was 56.5%, and the percentage of irregular publication reached by allocating an irregular space whenever A scientific event or issue occurred, which came to approximately 39.1%.

- As for the periodical of publishing on science issues, Jordanian media institutions provide coverage of the science issue like science, health, environment, technology, and other issues irregularly in line with the previous result and with a large percentage of 74%, daily by 21.7%, and weekly by 4.3%.

- The challenges related to publishing about science issues are almost the same in most of the Arab countries included in this study, but the differences in the percentages of these challenges and their entirety, as journalists in Jordan support looking at science as dry content that is difficult to understand by 43%, and the stand came from this. Journalists who were neutral to this matter are by 26%, while this challenge is opposed by 31% of journalists in Jordan.

- A rate of 60.9% stands on the impartiality of the difficulty of communicating with scientists in Jordan, and 30.2% support the existence of hardship in communicating with scientists and researchers, while the existence of this challenge is opposed to its basis 8.7%.

- Most of the journalists in the study sample in Jordan agree that few specialized journalists can cover science issues, by 69.6%. In comparison, the remaining 30.4% is neutral from this challenge, among the challenges of spreading and sustaining scientific journalism in Jordan. It is a result that reflects the necessity of training and building capacity in the skills of science journalism on a large scale in Jordan and other Arab countries.

- About the policies of the Jordanian media and the extent of their standing as an obstacle to the science media, 43% of journalists stand for neutrality in this matter, 39% support it, and 17.9% of journalists oppose this.

- It seems that standing on neutrality among the challenges of science journalism is a feature of the Jordanian journalists 'response to this questionnaire. The vast majority of the sample stood on neutrality, saying that science and scientific topics do not receive readers' interest by 39%. In comparison, 30.9% opposed it, and 30% of journalists agreed.

- The majority of journalists in Jordan included in this questionnaire support the lack of training and qualification of science editors or those interested in covering science in Jordan, at a rate of 65.6%, and 17.4% of journalists stand on the impartiality, while 17% of the sample oppose this.

87% of the journalists' understudy stated that no media institutions specialize in covering science in Jordan, and the remaining 13% saw these institutions' existence distinguished for their scientific coverage in Jordan.

- The percentage of those interested in writing about science in Jordan was 52%, while 48% of the journalists who responded to the questionnaire expressed their lack of interest in writing about science.

- Journalists 'skills and abilities vary in Jordan about the level and degree of mastery of the skills of journalism, as they are excellent in writing news reports, investigative stories, and with a remarkable degree among a large percentage of journalists in Jordan, reaching 34.7% in the mastery of writing news stories, then 43.5% in the mastery of interviews and talks, However, there is a percentage of Jordanian journalists who are not good at producing multimedia: 26.1% of journalists are not good at producing video, 39.1% are not good at producing podcasts, and about 47.8% of journalists are not good at producing infographics, which makes training on the production of multimedia content in Jordan and the rest of the countries, sample study, is an urgent necessity.

- Based on the previous result, 74% of the respondents of the sample of journalists in Jordan demand specialized training in science journalism, and 60.8% of journalists demand that training be focused around the production of multimedia content, and 17.3% of journalists demand training in features and investigative stories, 21.7% did not specify the type of training, and 65.2% of journalists in Jordan demand that Arabic be the language of training and 13% demand that English be the language of training, and 21.7% did not specify the desired language of training.

- 87% of scientific journalists and those interested in covering science issues in Jordan support the training being face-to-face, so more than 51% are against holding lectures via the Internet, and 25% of the sample support it, and the remaining percentage is dispersed between standing on neutrality or not defining the form of the lectures, and the truth is that the repercussions of the Corona pandemic, which locked humanity in forcible quarantine, varying between total and partial, created a great desire to move, go out and travel, and with the blurring of the announced position of vaccines, the views of people and the opinions of the sample of respondents confused between physical and virtual training, and 51% of journalists oppose lectures via the Internet through podcasts, and 56% of them oppose integrated training via the Internet, which is a particular case in Jordan, such as Iraq, by comparison with the previous six countries, although a large percentage of journalists confirmed the quality of the level of Internet service in Jordan to hold these training courses, and a very limited percentage confirmed poor Service is 8.7%, and 4.3% of journalists said that the Internet is entirely unreliable in Jordan.

- A large percentage of Jordanian journalists, 86.9%, agreed that there are no institutions in Jordan that offer training or academic degrees in the field of science journalism. This result reflects the urgent need for training courses in the skills and arts of producing scientific content in its various forms, especially the production of multimedia content in Jordan.

- Journalists in Jordan who were included in the study sample suggest designing training programs that address: Multimedia content production, writing features and investigative stories, then a basic introduction to science journalism, how to find and evaluate a potential science news story, how to present an idea of a science story to an editor, how to write a story based on a scientific research paper, how to write a story based on a statement A journalist, how to find and evaluate a potential scientific news story, how to present an idea of a science news story to an editor, how to write a news story based on a scientific research paper, how to write a story based on a press release, how to interview a scientist and how to write a story based on That interview, how do you produce multimedia content to cover a story, how do you interview a scientist and how do you write a story based on that interview, how do you produce multimedia content to cover science story, the necessity to take specialized courses in creative writing.

9- Sudan

- In Sudan, from which 14 respondents responded to the questionnaire, representing 6.5% of the total study sample, the percentage of youth in the age group from 21-35 reached 64.3%, while the percentage of middle-aged journalists in the age group from 36-50 was 35.7%.

- The male journalists constituted the largest percentage of journalists who responded to the questionnaire in Sudan who work in science journalism and those interested in covering science issues, at a rate of 64.3% compared to 35.7% for female journalists. This reflects a numerical advantage in the number of working males and those interested in scientific journalism versus females.
- The levels of experience in practicing scientific media in Sudan varied, but the predominance is for beginners from 1-3 years of experience by 50%, followed by those with long experience spanning more than ten years and their percentage reached 21.4%, followed by those with medium experience from 7-10 in the same proportion 21.4% also for those with experience from 4-6%, their percentage was 7.1%.

- 47.8% of journalists in Sudan work for media organizations published on digital platforms, at a rate of 50%. In comparison, 35.7% work in entities that combine printed publications and digital platforms together, and the lowest percentage of the Sudanese journalists' sample works in printed publications by 14.3%. This result reflects the familiarity of journalists in Sudan with digital platforms and print publications alike.

- Regional coverage outperforms the geographical scope of Sudan platforms for public and science affairs by up to 50%. In comparison, the local coverage rate represents 42.9%, and international coverage by the remaining 7.1%, which means that the prevailing trend on media institutions is the regional and local orientation most of the time for science issues, and it is a frequent finding in most of the Arab countries that have been subject to this study.

- The analytical study confirmed that the Arabic language is the predominant language for publishing about science issues at a rate of 100%, which is a result that makes adopting the Arabic language as a basis for training an indispensable option according to the opinion of the majority of journalists in Sudan.

- A large percentage of journalists in Sudan confirmed that their newspapers and digital platforms provide coverage of science issues, at a rate of 71.4%, while 14.3% of the sample went to the fact that their media institutions did not provide science coverage before, and the same percentage came to 14.3% for those who used to present science coverage but stopped.

- The statistical analysis results revealed the interest in covering science issues in the Sudanese media, as the prevalence of spreading science and its issues irregularly by allocating an irregular space whenever a scientific event or issue occurred, which came approximately 42.9%. This is followed by publishing in a section devoted to science at a rate of 28.6%, then published under the section on internal and miscellaneous news at 21.4%.

- As for the periodical of publishing coverage of science issue, Sudanese media institutions provide coverage of science issues like science, health, environment, technology, and others on an irregular basis in line with the previous result and with a large percentage of 57.1%, and weekly by 35.7%. The periodicity limiter is 7.1%.

- The challenges related to publishing about science issues are almost the same in most Arab countries included in this study. However, the differences in the percentages of these challenges and their entirety, as journalists in Sudan support viewing science as a dry content that is difficult to understand by 57.3%, and the stand came from this. The matter is impartial, 21.4%, while this challenge is opposed by 11.3% of journalists in Sudan.

- 49.2% support the existence of difficulty communicating with scientists and researchers, while 28.4% oppose the existence of this challenge, and 21.4% of the difficulty in communicating with scientists in Sudan stands on impartiality.

- All journalists in the study sample in Sudan agree that few specialized journalists can cover science issues by 85.7%. In comparison, the remaining percentage of 14.3% is neutral from this challenge. It is a result that reflects the necessity of training and qualification in the skills of science journalism on a large scale in Sudan and other Arab countries.

- With regard to the policies of Sudanese media agencies and the extent of their standing as an obstacle to science journalism, all Sudanese journalists support the existence of this challenge with a rate of 92.9%, while 7% of journalists stand on impartiality of this matter.

- With regard to the statement that science issues do not enjoy the readers 'interest, their support was equal to the percentage of opposition by 42.8% for each group separately, while 14.2% of the journalists stood on the impartiality.
- The study sample of journalists in Sudan included in this questionnaire gathers the existence of weakness in training and qualifying science editors or those interested in covering science in Sudan, at a rate of 100%.

- 57% of the journalists who joined the study said that no media institutions are specializing in covering science in Sudan, and the remaining 42.9% saw the existence of these institutions distinguished for their scientific coverage in Sudan.

- The percentage of those interested in writing about science in Sudan reached 85.7%, while 14.3% of the journalists who responded to the questionnaire expressed their lack of interest in writing about science.

- Journalists' skills and abilities vary in Sudan with regard to the level and degree of their mastery of the journalism skills, as they are good at writing news reports and investigative stories, with grades from good to average, and the majority of the sample respondents know that 50% of the sample is good at writing articles with an excellent degree. However, there is a percentage of Sudanese journalists who do not know how to produce Multimedia content: 35.7% of journalists are not good at producing video, 78.6% are not good at producing podcasts, and about 64.3% of journalists are not good at producing infographics, which does training in the production of multimedia content in Sudan and the rest of the countries a sample Study is a necessity.

- Considering the previous result, 100% of the journalists in Sudan demand specialized training in science journalism, 78.6% of journalists demand that training be focused on the production of multimedia content, and 21.4% of journalists demand training in writing features and investigative reports.

- 92.9% of journalists in Sudan demand that Arabic to be the language of training, and 7.1% demand that English be the language of training.

- 93% of science journalists and those interested in covering science issues in Sudan support the training being face-to-face, 50% support training through online lectures, 35.7% of the sample oppose it, and the remaining 14.2% are neutral.

- 50% of Sudanese journalists oppose lectures via the Internet through podcasts. In comparison, 64% of them support integrated training via the Internet, and a large percentage of journalists confirm the quality of the level of Internet service in Sudan for holding these training courses at 77%. A minimal percentage confirms poor service 7.1% and 14.2% of journalists said that the Internet is completely unreliable in Sudan.

- A large percentage of Sudanese journalists, amounting to 85.7%, went to the absence of institutions in Sudan that offer training or academic degrees in the field of science journalism. This result reflects the need for training courses in the skills and arts of producing scientific content in its various forms, especially the production of multimedia content in Sudan.

-Journalists in Sudan who were included in the study sample suggest that training programs be designed that address: Skills to simplify science and present it in the media, how to verify facts in science news, find the scientific sources that I must rely on, and how to filter them, produce multimedia content, write features and investigative stories, then a basic introduction to science journalism, how to find a story, How to write a story based on a scientific research paper, how to write a story based on a press release, how to find and evaluate a potential science story, how to present an idea of a science story to an editor, how You write a story based on a scientific research paper, how to write a news story based on a press release, how to conduct an interview with a scientist and how to write a story based on that interview.

10- Yemen

- In Yemen, of which 16 respondents responded to the questionnaire, representing 7.4% of the total study sample, the percentage of youth in the age group from 21-35 reached 62.5%, while the percentage of middle-aged journalists in the age group from 36-50 reached 37.5%.

- The male journalists constituted the largest percentage of journalists who responded to the questionnaire in Yemen, who work in science journalism and those interested in covering science issues, at a rate of 75% compared to 25% for female journalists. This reflects a numerical advantage in the number of working males and those interested in science journalism versus females.

- The levels of experience in practicing science journalism in Yemen varied, but experienced people prevailed from 4-6, so their percentage was 50%. They are followed by beginners with 1-3 years of experience with a rate of 25%, followed by those with long experience spanning more than ten years, who account for 18.8%, followed by those with medium experience from 7-10 at a rate of 6.2%.

- 47.8% of journalists in Yemen work in agencies that combine printed publications and digital platforms together, at a rate of 62.5%, followed by workers in media organizations that publish on digital platforms only by 37.5%, and the absence of workers in printed publications may indicate a state of complete digitization in Yemen which is witnessing difficult conditions. This result may also reflect the deteriorating financial and economic conditions of traditional newspapers and media institutions that cannot meet printing copies' requirements.

- Local coverage prevails over the geographical range of coverage of different media platforms in Yemen for public and science issues by 68.7%. In comparison, the regional coverage rate represents 18.8%, and international coverage is 12.5%, and this means that the prevailing trend for media institutions are the internal local coverage, most of the time for science issues, and it is a frequent finding in most of the Arab countries that were subject to this study.

- The analytical study confirmed that Arabic is the dominant language for publishing about science issues in Sudanese media, at a rate of 100%, which is a result that makes the adoption of the Arabic language a basis for training an indispensable option according to the opinion of the majority of journalists in Yemen.

- A percentage of journalists in Yemen confirmed that their media platforms provide coverage of science issues at a rate of 50%, while 37.5% of the sample went to the point that their media institution had previously provided scientific coverage and stopped, and 12.5% of the sample confirmed that their platforms don't cover science issues.

- The results of the statistical analysis revealed the interest in covering science issues in the Yemeni media, as the prevalence is for publishing science issues irregularly by allocating an irregular space whenever a scientific event or issue occurred, which came

approximately by 42.9%, and followed by publishing in a section devoted to science at a rate of 37.5%, then published under the section of internal and miscellaneous news at a rate of 31.2%.

- As for the periodical of publishing on science issues, Yemeni media institutions provide coverage of science issues like science, health, environment, technology, and others on an irregular basis in line with the previous result and by a large percentage of 50%, and weekly by 18.7%, daily by 12.5%, and on a monthly rate by 6.3%.

- The challenges related to publishing about science issues are almost the same in most Arab countries included in this study. However, the differences in the percentages of these challenges and their entirety, as 37.5% of journalists stand on the impartiality of looking at science as dry content that is difficult to understand, and 33.7% reject it, while 18.8% of respondents support the existence of this obstacle.
- 49.9% support the existence of difficulty communicating with scientists and researchers in Yemen, while 25% oppose the existence of this challenge, and 25% stand on the impartiality of the difficulty of communicating with scientists in Yemen.

- 69% of the journalists in the study sample in Yemen agree that few specialized journalists can cover science issues. In comparison, 18.5% of the sample rejects this challenge, the remaining 12.5% stands to be neutral from this challenge, and it is a result that reflects the necessity of training and qualification on scientific journalism skills on a large scale in Yemen and other Arab countries.

- Concerning the policies of Yemeni media institutions and the extent of their standing as an obstacle to science coverages, most Yemeni journalists support this challenge's existence with a rate of 68.7%. In comparison, 18.7% of journalists stand on this matter's impartiality, and 12.5% of journalists oppose it.

- 37% of Yemeni journalists support the statement that science and scientific topics do not enjoy readers' interest, and 31% of journalists oppose it, and 31.5% of them are neutral.

- The study sample of journalists in Yemen included in this questionnaire collects a weakness in training and qualifying science editors or those interested in covering science in Yemen, at a rate of 81.2%, while 18.8% oppose that.

- 75% of the journalists who joined the study stated that no media institutions are specializing in covering science in Yemen, and the remaining 25% saw these institutions' existence distinguished by their scientific coverage in Yemen.

- The percentage of those interested in writing about science in Yemen reached 75%, while 25% of the journalists who responded to the questionnaire expressed their lack of interest in writing about science.

- Journalists' skills and abilities vary in the level and degree of their mastery of journalism skills, as they are good at writing news reports and investigative stories, with degrees from good to average for the majority of the sample with a distinct few of the sample members, but among the striking results is that 18.7% are not good at writing news stories The same percentage is not good at writing opinions. There is a percentage of Yemeni journalists who are not good at producing multimedia: 31.2% of journalists are not good at producing video, 50% are not good at producing podcasts, and about 56.2% of journalists are not good at producing infographics. This does training in multimedia content production in Yemen and the rest of the study sample a necessity.

- In light of the previous result, 93.7% of the sample of journalists in Yemen demand specialized training in science journalism, and 75% of journalists demand that training be focused around the production of multimedia content, and 18.8% of journalists demand training in writing features and investigative stories, the remaining percentage did not specify the actual training need for them.

- 93.8% of journalists in Yemen demand that Arabic be the training language, and 7.1% did not specify a language for training.

- 75% of science journalists and those interested in covering science issues in Yemen support the training being face-to-face, so 43% of journalists oppose the training to take place online and 37.5% stand on the neutrality of the matter, and 18% of the sample support it and the percentage remains 18.8% did not accurately specify their desire.

- 50% of Yemeni journalists oppose lectures via the Internet through podcasts, while 43% oppose integrated training via the Internet, and 37% of the sample stands on the training form's impartiality. It seems that these percentages are justified based on the modest level of Internet service in Yemen, which came Average level of 43.7%, bad at 31.2%, and not completely reliable at 25%.

- A large percentage of Yemeni journalists, 87.5%, went to the absence of institutions in Yemen providing training or academic degrees in the field of science journalism. This result reflects the urgent need for training courses in the skills and arts of producing scientific content in its various forms, especially the production of multimedia content in Yemen.

- Journalists in Yemen who were included in the study sample suggest designing training programs that address: Focusing on the use of attractive introductions to the reader, the use of data journalism in science coverage, how to harmonize writing scientific content and simplifying it to the general readers, how to produce a short film with scientific content and new discoveries, skills to simplify science and present it in the media, how to check facts in science stories, knowing the scientific sources that I should rely on and how to filter them, producing multimedia content, writing features and investigative stories, then a basic introduction to science journalism, how to find and evaluate a potential scientific news story, how to present an idea of a science story to an editor, how to write a story based on a scientific research paper, how to write a news story based on a press release, how to find and evaluate a potential scientific news story, how to present an idea of a scientific news story to an editor, how to write a story based on a scientific research paper, how to write a story based on a press release.

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