MEDICAL KNOWLEDGE EXCHANGE BY CROSS-CULTURAL EDUCATION PROJECTS: A PRACTICAL APPROACH BASED ON A STRUCTURED QUALITATIVE ANALYSIS OF RADIOLOGY TEACHING IN AZERBAIJAN

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In 2015, the World Health Organization announced its Sustainable Development Goals. This agenda contributes to reducing inequity in healthcare and improving health. In a world with major differences between countries, the following question should be asked: How can healthcare professionals in general (and radiologists in particular) from high-income countries (HIC) and low- and middle-income countries (LMIC) work together to improve global health? **The purpose** of this paper is to evaluate several recent cross-cultural educational efforts in radiology in Azerbaijan and to formulate practical recommendations for radiology education and medical education in general carried out in LMICs by volunteers from HICs. **Methods.** From a series of four consecutive education projects, we analyzed the evaluation forms of two of the sessions. Furthermore, we evaluated all four education projects by systematic comparison and reflection on 21 items in the categories Background Information, People, and Practice. **Results.** To all items in the list, a reflection was added that included viewpoints from both visiting and host professionals. The evaluation forms demonstrated that the third education project with practical radiology content was valued higher than the fourth education project on quality management. The participants of both education projects would recommend projects like these to their own colleagues. We formulated recommendations for short-term cross-cultural education projects based on the systematic evaluation, the reflection, and the evaluation forms. **Conclusion.** This systematic evaluation of serial cross-cultural radiology education efforts in Azerbaijan fills a gap in global health research. It is an example of evidence-based cross-cultural teaching, and it identified recommendations for future projects. A key finding is the importance of serving the host country's professionals by carefully assessing their needs. Educational efforts should be seen in the broader context of healthcare development.

Keywords: Continuing Medical Education, Radiology, Healthcare Disparities, Collaboration

Introduction. With continuing technological developments and increasing healthcare budgets in high-income countries, global health inequity is increasing. A recent analysis from the Global Burden of Disease Study 2015 demonstrates the inequity in many health related domains [1].

How can skill-based volunteering in general, and in radiology in particular, improve global health? To answer this question, we first place it in a wider context.

Healthcare development in low- and middle-income countries (LMICs). The World Health Organization (WHO) promotes health financing for universal coverage. Universal health coverage (UHC) aims to ensure that everyone, everywhere, can access quality health services without facing financial hardship as a result. In 2015, the World Health Organization announced 17 Sustainable Development Goals (SDG) and 169 targets as the 2030 agenda for sustainable development [2].

Only one SDG target focuses on the development of healthcare workers, but because one SDG or target can influence another [3], investing in healthcare worker education also impacts other targets. Recognizing the importance of investing in healthcare workers, the WHO states, 'Their engagement in creating healthier and more productive nations is the most cost-efficient and rational way to get the SDGs achieved.' [4]. In addition, 'The convergence of human resources for health (HRH) and UHC has the potential to substantially strengthen LMIC health systems' [5].

Importance of improvement in medical education. The provision of trained health workers is a key component in strengthening and providing an efficient health system [6]. Continuous education meetings and workshops can improve professional practice of healthcare workers and improve healthcare outcomes for patients [7]. To be effective, attention should be

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paid to educational methods. Learner-centered and interactive approaches are generally recommended [8, 9]. Medical education is not only important to train healthcare workers, but the availability of medical education in remote areas is also suggested to be one of the factors to retain healthcare workers in underserved areas [10]. Although effective medical education is vital for high-quality healthcare, there are major differences between countries in approach and research related to medical education [11]. In LMICs, continuous medical education is not as widely available as in HICs, and there can be financial restraints to participation in high-quality medical education opportunities abroad. Visiting teachers from HICs may contribute positively in these situations.

Value of exchange between providers from different countries. A recent systematic review evaluated the medical literature on the effectiveness of short-term medical missions (MSTs) from 1993 to 2013 [12]. Half of the included studies indicated an educational component or exchange aimed at increasing the knowledge of local providers. Only two studies focused solely on education. In general (not focusing on education), the author states that there is a need for more comprehensive data collection and outcome assessment to justify, quantify, and verify the impact of MSTs. A short-term medical mission can result in bidirectional knowledge transfer. Both host country and visiting professionals can benefit, particularly if a longer term relationship is established with repeat visits by the same individuals or groups [13]. This knowledge exchange might also lead to the identification of novel approaches to addressing problems of escalating costs and access to healthcare in HICs [14]. Evaluation of short-term medical missions should be done with care because conflict of interest might impede objective evaluation [15]. Maki provides a standardized tool for MST evaluation. This tool includes items related to the educational aspect of MSTs [16] but is not specifically designed for educational MSTs in radiology.

Cross-healthcare system exchanges in radiology education. Radiology services are readily available in HICs, but this is certainly not the case for the majority of the world's population [17]. Because of their dependence on expensive technology, many radiology services can be considered high-cost healthcare. Teaching effective use of radiology resources in

LMICs can contribute to improved access and cost savings by avoiding unnecessary examinations. Because HICs are making the change from volume-based pricing to value-based pricing [18, 19], sharing this knowledge can help radiologists in LMICs in effective resource utilization. Additionally, sharing knowledge about high-tech solutions such as teleradiology may help LMICs provide high-quality radiologic consultations to more of their population in a cost-effective way, thus helping them achieve the World Health Organization goal of quality healthcare for all [20-22]. However, not every technology that is effective in HICs is applicable in LMICs. Priority-setting is important in Universal Health Coverage, and guidelines to do that are available [23].

Despite the importance of cross-healthcare system education in radiology, there are no evidence-based methods available for providing such education effectively using short-term missions. That does not mean there is no valuable information available for radiologists who want to share their knowledge with colleagues in resource-poor settings. In 2014, a book entitled *Radiology in Global Health* was published [24]. This book is entirely dedicated to radiology and global health and is indispensable for radiologist and other healthcare professionals with an interest in global health. One chapter outlines strategies for medical education [25]. The author emphasizes the importance of MST participants carrying out and publishing research related to the effectiveness of MSTs so that participants and others can learn from their critical evaluation.

The purpose of this paper is to evaluate several recent cross-cultural radiology educational efforts in Azerbaijan and to formulate practical recommendations for radiology education and medical education in general in LMICs by volunteers from HICs.

Methods. From 2014 to 2016, we organized four radiology education projects in Baku, Azerbaijan. The education projects were all initiated by a Dutch non-profit organization, DuRad Exchange, and organized in close collaboration with healthcare professionals in Azerbaijan.

Study design and data collection. We retrospectively evaluated these education projects by a systematic comparison and a reflection on 21 items in the categories Background Information, People, and Practice. We provide the definitions of the items in Tab. 1.

Table 1

Definitions of the characteristics that were analyzed

Background information	
Cultural factors	Description of cultural factors that presumably had impact on the effectiveness of the education project.
Healthcare system factors	Description of healthcare system factors that had impact on the effectiveness of the education project.
People	
Local contact person	Professional and personal characteristics of the principal education project organizer in the country where the education project occurred.
Teacher	Professional characteristics of the person who was speaker at the education project.
Interpreter	Presence or absence and characteristics of the interpreter during the education projects.
Recruitment of participants	How, when, and by whom the participants were recruited.
Target audience - expected	Audience for whom the education project was developed.
Target audience - actual	Characteristics of the people who actually participated in the education project.
Interaction	Methods that were planned to be used to promote interactions and a description of the level of interaction that was achieved.
Practical issues	
Preparation	Characteristics of the activities in the months before the education project and by whom they were performed.
Education project fee	Description of whether the participants had to make a financial contribution by themselves, other than personal expenses such as traveling costs.
Funding	Description of how and by whom the different aspects of the education project were funded.
Locations	Description of the location or locations where the education project occurred.
Audiovisual equipment	Description of the audiovisual education project site.
Scheduling	Dates and duration of the education project.
Content	Professional content of the education projects.
Presentations	Duration, number, and method of presentations.
Translation	Availability of bilingual slides during the presentations, and eventually how and by whom they were provided.
Accreditation	Whether the education project was officially accredited as continuing medical education (CME).
Educational material after project	Description of digital or non-digital educational material that was provided for the participants after the education projects.
Evaluation	Whether the participants or local organizers had the opportunity to provide feedback and a summary of this feedback.

For each item, one author (AO) completed the factual information of the four education projects and added reflections on this information. To include the viewpoint of the sending organization, the local organizers and the teachers, sequentially the other authors added to or corrected the factual information and reflections.

Based on the characteristics and the reflection of four education projects and the formal evaluation forms of two education projects, we present recommendations.

Furthermore, we analyzed the results of evaluation forms. At education project 3 and education project 4, the participants were asked to complete evaluation forms with three statements in Azerbaijani to be answered on 5-point scale:

- This education project was a good fit with my previous experience and knowledge.
- This education project provided information applicable to my daily practice.
- I would recommend this education project to my colleagues.

To assess the differences of the results, the Mann-Whitney U test was applied using an online tool (<http://www.socscistatistics.com/>).

Results

Data. Tables 2-4 provide an overview of our systematic analysis of four teaching courses in Azerbaijan.

The data from the evaluation forms of education project 3 and education project 4 are summarized in Tab. 5.

Based on reflections from the four education projects and the direct feedback that was obtained from two of them (Tables 2-5), we deduced the following recommendations for organizing short-term education projects.

Recommendations

Background information

Cultural factors

Teachers should seek to understand cultural differences and reflect this understanding and appreciation in their presentations. Local and expatriate contacts can provide valuable cultural insights.

Healthcare system factors

In the selection of topics, the availability of techniques and the expected future possibilities in the host country should be taken into account. Because

the background knowledge of participants is highly dependent on previous training, this should be explored (maybe investigated ahead of time) to maximize the benefit of the educational activity to the participants in their daily practice.

People

Local contact person

We strongly recommend having one or more local contacts (national or expatriate fluent in the local language) who well understand the local healthcare context and are experienced in organizing healthcare education projects. They can facilitate good communication with receiving institutions related to organization and logistics of educational MSTs and topics to be covered.

Teacher

Beforehand, the extent of the education project can be adjusted to the number of participating teachers. Factors such as the educational experience of the teacher, topics requested by receiving institutions, time needed to prepare presentations, time needed to discuss logistics before the MST, and budget for traveling expenses may help in determining the optimal number of teachers for a particular education project.

Interpreter

Having one or more pre-arranged, native speaker interpreters who are fluent in the language of the presenters and preferably have knowledge of the topic of the educational project is highly advisable. Keep in mind that the use of an interpreter to translate everything into the local language will approximately double the time of the education project and thus limits the amount of information that can be exchanged.

Target audience

If the participants are expected to have diverse backgrounds, it is advocated to adjust the program. One solution would be to prepare and advertise both a basic education project and an advanced education project for different audiences.

Interaction

Attention should be paid to promoting interaction, but without relying too much on digital systems (such as the smartphone based interactive voting system). Again, involvement of a highly skilled interpreter is crucial to ensure that questions and answers are clearly communicated and understood.

Recruitment of participants

Active and engaged local contacts generally play

Table 2

Background information. Each column corresponds with the factual information from the separate seminars, and each topic is accompanied by a reflection based on the authors' opinion

Cultural factors			
I The teacher had very limited knowledge of the Azerbaijani culture.	II The teacher had limited knowledge of the Azerbaijani culture.	III The local non-native contact coached the teachers in relevant cultural factors.	IV The local non-native contact coached the teacher in relevant cultural factors.
Reflection: How important is hierarchy in the host country? How much do gender differences play a role? What role does religion play in the daily lives of the participants? Teaching abroad can be challenging, but it also contributes to mutual respect.			
Healthcare system factors			
I The teacher had no knowledge of the Azerbaijani healthcare system. The seminar organizers (teacher and local contact) conducted a survey among participants to disclose differences in the healthcare systems of the participants and the teacher.	II The teacher had limited knowledge of the Azerbaijani healthcare system, based on the previous survey but was unaware of the background knowledge of all participants. The local native contact had possibly limited awareness of the knowledge and skill level of the teacher and whether they would fit with the expectations of the participants.	III The availability of techniques can differ highly between countries. Procedures such as musculoskeletal ultrasound guided injection by radiologist are common practice in the teachers' country but not at the site of the seminar. The presentations on this topic were therefore illustrative.	IV Even though the topic Quality Management is relevant in every healthcare system, the practical relevance in daily practice is highly dependent on the responsibility and position of a participant. A relevant question is whether quality projects are performed by doctors or by directors and their staff.
Reflection: Differences in healthcare systems between countries should not be underestimated by the organizing committee. Did the educational system provide the participants with basic knowledge in radiology? Are the procedures that are explained in the presentations common practice in the host country, or is it expected that they can be implemented? Questions such as these should be explored during seminar preparation. The more reflective topic of seminar IV was relevant for the healthcare system of the host country in general, but possibly not for each individual participant.			

Table 3

People. Each column corresponds with the factual information from the separate seminars, and each topic is accompanied by a reflection based on the authors' opinion

Local contact person			
I Local, native Azerbaijani neurologist of receiving institute, experienced in teaching and organizing healthcare seminars.	II Local, native Azerbaijani neurologist of receiving institute, experienced in teaching and organizing healthcare seminars.	III Local, non-native healthcare consultant, fluent in the local language, experienced in teaching and organizing healthcare seminars.	IV Local, non-native healthcare consultant, fluent in the local language, experienced in teaching and organizing healthcare seminars.
Reflection: The local contacts proved to be very valuable. Without their on-site and in person assistance, it would have been much more difficult to coordinate scheduling and topic selections with the host institutions.			
Teacher			
I one radiologist	II one radiologist	III two radiologists	IV one radiologist
Reflection: Having more than one medical specialist participate in an MST not only shares the teaching load but also creates opportunity for collaboration and joint decision making related to the format of seminars and gives participants access to a broader range of experience during case discussions. However, it is important to ensure that all team members are good teachers and have adequate clinical experience to ensure high quality of the seminars. Funding and availability of volunteers may limit the size of MSTs.			

Table 3 (continue)

People. Each column corresponds with the factual information from the separate seminars, and each topic is accompanied by a reflection based on the authors' opinion

Interpreter			
I Native Azerbaijani interpreter, fluent in English.	II Native Azerbaijani interpreter, fluent in English.	III Native Azerbaijani interpreters, fluent in English. In two institutes, this was a radiologist, and in one institute, not a radiologist. In the fourth institute, no interpreter was desired by the host institution, but not all participants were able to understand English very well.	IV Native Azerbaijani interpreter, fluent in English, radiologist. In one institute pre-arranged, in the other institute ad hoc.
Reflection: Beforhand, the teacher should realize how many of the participants do or do not understand English. A good interpreter proved indispensable for communication and discussion with the participants.			
Recruitment of participants			
I Participants were already in the department where the seminar occurred because of their periodical required post-graduate training. The seminar replaced a regular part of their program.	II Participants were already in the department where the seminar occurred because of their periodical post-graduate training. The seminar replaced a regular part of their program.	III The heads of the four radiology departments or the manager of the office of international affairs invited the participants.	IV The head of the department of international relations in one institute and the head of the radiology department of another institute recruited the participants for the seminar.
Reflection: Depending on the type of hospital, a different approach might be needed. Cultural factors should be taken into account and respected. It is important to ask the right person to recruit participants.			
Target audience - expected			
I Neurologists with basic experience in radiology	II Neurologists with basic experience in radiology	III Radiologists with basic experience in the scheduled topics.	IV Radiologist in leading positions, supervising junior radiologists and influential in starting quality improvement projects.
Reflection: In the first two seminars, the background and experience of the target audience was not carefully discussed between the teacher and local organizer. In the preparation of the second two seminars, there was more advanced discussion concerning the makeup of the target audience.			
Target audience - actual			
I A mixed group of 35 participants at the Azerbaijan State Advanced Training institute for Doctors, ranging from neurologists without any experience in neuroradiology to neurologists very experienced in reading CT and MRI.	II 30-40 participants at the Azerbaijan State Advanced Training institute for Doctors. A different group of neurologists than seminar I, but with the same diversity. Participants were in the institute for their 5-year periodical training program. They came from the capital and from rural areas.	III 70 participants from the Medical University, 70 participants at the Azerbaijan State Advanced Training institute for Doctors, 30-40 participants at Merkezi Hospital, 10-12 participants at the National Oncology Center. Partly also dependent on the four receiving institutions, the audience experience ranged from very experienced radiologists with some	IV 25 participants at the Azerbaijan State Advanced Training institute for Doctors and 17 participants at the National Oncology Centre. Radiologist and residents with different backgrounds: Ultrasound radiologist, CT radiologists, MRI radiologists, and X-ray-radiologists.

Table 3 (continue)

People. Each column corresponds with the factual information from the separate seminars, and each topic is accompanied by a reflection based on the authors' opinion

		Western training to inexperienced medical students.	
Reflection: The different levels of experience among the participants in all four seminars were not expected beforehand. Some participants came on their own initiative, and others were expected to come by their departments. The high diversity makes it difficult for the teacher to provide information at the level of each participant. The combination of private hospitals and governmental hospitals also contributed to the mixed audience. In seminar 3, one group of expected participants did not come for unknown, possibly political, reasons. Careful discussions beforehand cannot prevent unexpected changes.			
Interaction			
I Limited interaction with participants.	II During the week increased interaction, particularly with the participants in the first rows. No interaction with participants in the back rows. An online voting system was used.	III In the smaller groups good interaction, in the larger groups good interaction with a part of the group. An online voting system was planned for use but failed.	IV Good interaction, particularly during case discussions and in smaller groups.
Reflection: Highly advanced online voting systems are good for interaction but can be counterproductive in case of failing wifi or limited computer literacy. Presenting cases contributed to interaction. The already mentioned diversity of participants presented a challenge.			

Table 4

Practise issues. Each column corresponds with the factual information from the separate seminars, and each topic is accompanied by a reflection based on the authors' opinion

Preparation			
I The teacher and local contact person began discussions on topics 4 months before the seminar. Initiative for topics came from the teacher. There was limited coordination with the target audience.	II The teacher suggested the topics 2 months before the seminar and received confirmation from the head of the department of the host institute by way of the local contact person. The teacher had limited knowledge of the target audience.	III The teachers made a broad list of radiology topics with a short description of each approximately 4 months before the seminars. The local contact person discussed the topic list with senior radiologists at the host institutions, who selected the topics most relevant for the target audience. The local contact person coordinated the selection process with leaders from the several host institutions to ensure a manageable final list of topics. Decisions on final topics varied by institute. At one institute, the desired topics were changed within the last 2 weeks before the seminars.	IV The teacher suggested a specific radiology topic. The local contact person promoted this topic to several potential host institutes and got agreement with leaders of two institutes who desired this topic. The final agreement of one of the institutes was reached several weeks before the seminar.

Table 4 (continue)

Practise issues. Each column corresponds with the factual information from the separate seminars, and each topic is accompanied by a reflection based on the authors' opinion

Reflection: Careful selection of topics is important to ensure an effective knowledge exchange. The limited choice for the institutes in courses II and IV may have been more convenient for the speaker but had the risk of limited adaption to the audience. The broad list of potential topics for course III gave the receiving institutes more say in the course content but led to additional preparation time for the speakers.			
Seminar fee			
I No fee was requested from participants	II No fee was requested from participants	III No fee was requested from participants	IV No fee was requested from participants
Reflection: In Western countries, a small fee sometimes contributes to involvement of participants. The limited financial resources of the participants and the organizational structure of the host institutes led the organizers to decide not to charge a fee.			
Funding			
I Teacher traveling expenses were covered privately by the teacher himself. Seminar venue was in the receiving party's own institute. Interpreter costs were covered by a small grant from a local company.	II Teacher traveling expenses were covered by a non-profit organization. Seminar venue was in the receiving party's own institute.	III Teacher traveling expenses were covered by a non-profit organization. Seminar venue was in the receiving party's own institute. Translation costs were covered by the local contact person. Interpreter costs were covered by receiving institutes.	IV Teacher traveling expenses were covered by a non-profit organization. Seminar venue was in the receiving party's own institute. Translation costs were covered by the local contact person. Interpreter volunteered.
Reflection: A teacher can go at his own expense to a host country, but easier funding is expected when a sending organization is involved. In addition to funding, a sending organization can build up experience and relations to facilitate teaching projects.			
Locations			
I Presentation was in regular teaching room of receiving institute.	II Presentation was in regular teaching room of receiving institute.	III Presentations were in regular teaching rooms and large lecture halls of receiving institute.	IV Presentation was in regular teaching rooms of receiving institutes.
Reflection: Arranging an appropriate room for the presentations is practically impossible by the sending organization or teacher.			
Computer and projector facilities			
I Projector with VGA connection for laptop	II Projector with VGA connection for laptop	III Projector with VGA connections. Inappropriate quality for radiological images because of small screen in a large room.	IV Projector with VGA connection of receiving institute, changed by local contact to a high-quality beamer with HDMI connector.
Reflection: Careful adjustment of presentation to expected beamer facilities should be done. Demonstrating radiological images requires high-quality beamer in a room with limited light.			
Scheduling			
I One seminar of 2 hours, scheduled for 17 June 2014, one day before a European Teaching Course in Neurology	II Five 3-hour seminars on five consecutive days from 9-13 February 2015, at a post-graduate training institute for doctors.	III Two 3-hour sessions or three 2-hour sessions at 4 separate institutions, from 26-30 October 2015.	IV Two 2.5-hour sessions and two 3.5-hour sessions at two separate institutions between 30 May and 3 June.
Reflection: for the speakers, repetition of the same program in several institutions reduced preparation time and effort. In seminar 3, there was limited time between some seminars, leading to a somewhat busy program for the speakers. Scheduling of the seminar depends on the local working hours and type of institution. In a post-graduate training institute, seminars can be scheduled during working hours, often replacing otherwise scheduled educational activities. Seminars for professionals working in a busy hospital practice might require adjusted scheduling, such as seminars at the end of the normal workday.			

Table 4 (continue)

Practise issues. Each column corresponds with the factual information from the separate seminars, and each topic is accompanied by a reflection based on the authors' opinion

Content			
I Introduction to neuroradiology for the neurologist.	II Neuroradiology for the neurologist, several topics such as tumors, stroke, multiple sclerosis, and back pain.	III Selection of topics on neuro-, abdominal, musculoskeletal, and breast radiology.	IV Seminar on Quality Management in Radiology (structured reporting, multidisciplinary teams, structured feedback, organizing quality improvement projects, economics of imaging).
Reflection: In seminars 1 and 2, the content was largely chosen by the speaker, leading to a suboptimal adaption to a selection of the participants. In seminar 3, the content was discussed with the institutes and adapted to their wishes. The more reflective topic of seminar 4 was approved by the institutes but probably not relevant for all participants.			
Presentations			
I One PowerPoint™ presentation, not adapted to time needed for interpreter. Cases presented in separate software package to view radiological images (DICOM viewer).	II Fifteen PowerPoint™ presentations, not optimally adapted to time needed for interpreter. Cases presented in separate DICOM viewer.	III Six presentations in Prezi™. Number of slides adjusted to time needed for interpreter. Cases presented in separate DICOM viewer.	IV Five presentation in Prezi™. Cases both in Prezi™ and in web browser for participants with laptops.
Reflection: In seminars 1 and 2, not all prepared material could be discussed because the speaker did not anticipate the time needed for interpretation into the local language. If an interpreter is needed, number of slides should be halved or the scheduled time doubled. Cases with radiologic imaging incorporated in PowerPoint™ or Prezi™ presentations take much less time compared with cases presented in a separate DICOM viewer. Copying of large image files onto participants laptops and explaining how to navigate the files prior to seminars can maximize discussion time, minimize time lost during seminars, and help participants to better engage in the discussions. A high computer literacy and facility should not be expected from every participant.			
Translation			
I Presentations not translated.	II Presentations not translated	III Presentations bilingual in English and Azerbaijani. The translator worked directly online in the shared presentation in Prezi.	IV Presentations bilingual in English and Azerbaijani. The draft of the presentation was sent in Word format to the translator. After translation, the teacher pasted the English and Azerbaijani text in the presentations in Prezi.
Reflection: In countries with participants with limited English proficiency, translated slides contribute to the understanding. The timing of the translation was in seminar III only a short time before the seminar, which resulted in limited time to optimize the layout of the slides because the slides became somewhat crowded with text. In seminar 4, the process of translation and preparation of the slides was separated in time.			
Accreditation			
I no accreditation	II no accreditation	III no accreditation	IV the course was accredited by the Dutch Radiological society.
Reflection: A request for accreditation may take several months to be processed but may be greatly appreciated by the participants. Even if there is no local national body governing CME registration, CME accreditation by a foreign medical organization has value.			

Table 4 (continue)

Practise issues. Each column corresponds with the factual information from the separate seminars, and each topic is accompanied by a reflection based on the authors' opinion

Educational material after seminar			
I A written paper on the topic was published in the local national neurology journal.	II After the seminar, all presentations were provided on a flash drive to the local contact.	III All presentations were provided in PDF and Prezi TM at a website.	IV All presentations were provided in PDF and Prezi TM , together with background information on a flash drive, SD card, or DVD to all participants. Afterwards, the PDF documents were available on a website.
Reflection: The availability of presentations was appreciated by the participants. In seminar IV, the flash drives and SD cards allowed participants to copy all presentations to their own digital devices. This process took too much time.			
Evaluation			
I Informal positive feedback from head of department of receiving institute.	II Informal positive feedback from head of department of receiving institute and from several individual participants.	III Paper feedback forms completed by the majority of participants, which showed positive results. Informal evaluation confirmed these results.	IV Paper feedback forms completed by the majority of participants of one site, which were fairly positive.
Reflection: The sending organization requested a formal evaluation for seminars 3 and 4 to ensure that the funding was well spent. For the teachers, the anonymous feedback forms provide information additional to the possibly biased informal evaluation.			

Table 5

**Summary of evaluation forms of education project 3 (October 2015)
and education project 4 (June 2016)**

This education project was a good fit with my previous experience and knowledge			
	October 2015 (n=65)	June 2016 (n=10)	Mann-Whitney test
1 = Strongly disagree	0%	0%	P<0.01
2 = Disagree	2%	10%	
3 = Neutral	8%	80%	
4 = Agree	28%	0%	
5 = Strongly Agree	63%	10%	
This education project provided information applicable to my daily practice			
	October 2015 (n=65)	June 2016 (n=10)	Mann-Whitney
1 = Strongly Disagree	0%	10%	P<0.01
2 = Disagree	2%	10%	
3 = Neutral	9%	70%	
4 = Agree	34%	10%	
5 = Strongly Agree	55%	0%	
I would recommend this education project to my colleagues			
	October 2015 (n=65)	June 2016 (n=10)	Mann-Whitney
1 = Strongly Disagree	0%	0%	P=0.06
2 = Disagree	0%	10%	
3 = Neutral	8%	30%	
4 = Agree	23%	20%	
5 = Strongly Agree	69%	40%	

a key role in making sure that education projects are appropriately advertised in advance to potential participants and that the projects have the support of institutional leaders and others who may influence participation.

Practical issues

Preparation

Good and timely (2–3 months) communication and joint decision making among the teachers, local contact person(s), and receiving institutions about topics will increase the likelihood of courses that are relevant to participants. Topics should be valuable for receiving institutions and applicable in the daily practice of participants to ensure active participation during the education project. Content should be thoroughly adapted to the knowledge level of the participants. Set realistic deadlines to ensure timely preparation of presentations and translations.

Education project fee

It is preferable that no fee be requested from participants to avoid financial constraints, but this may not always be true. Sometimes a conference that is paid for is more valued, and people may engage more if they are paying something for it.

Funding

Teacher traveling expenses should be covered by non-profit organizations to avoid additional costs for the receiving institute and to avoid high costs for the volunteer teacher. The education project venue preferably should be at the receiving party's own institute to avoid additional costs and to improve involvement and responsibility of the receiving party. Translation and interpretation should preferably be done by local volunteers, or costs should be covered by the receiving institute. Sometimes, teachers who come at the invitation of a government institute and are paid for out of the government budget may be better organized and more valued than education that is simply offered for free. Additionally, there may be government programs that would fund an MST.

Locations

Arranging an appropriate venue should be done by the receiving institute, and the expected number of participants should be taken into account.

Computer and projector facilities

In case of the lack of a high-quality HDMI projector, the teacher should bring his own projector. When an appropriate projection facility is lacking,

the presentations should be adapted.

Scheduling

Scheduling should be adapted to the receiving institution(s) to ensure maximal participation. For the speakers, effective preparation and a not overly busy program should be taken into account to allow ample time for discussion, travel between locations, and additional translation if needed.

Content

Careful selection of topics and thorough discussion beforehand is recommended to optimize adaption of the educational project to the needs of the participants. All stakeholders should agree with the objectives and content at the start of the education project.

Presentations

It is recommended to use one commonly used type of presentation software to ensure as little dependency as possible on different unknown systems to present cases. The length of the presentations should be adapted to the time required for an interpreter.

Translation

If participants are not fluent in the language of the visiting presenter(s), translation of slides can greatly add to the value of presentations. This can be achieved by either having both languages on the slides simultaneously or by providing translated hand-outs of the slides. This requires that the slides be ready and final well before the education project to allow ample time for local translators to do the translation.

Accreditation

Seeking accreditation by a national radiological society is recommended.

Educational material after education project

Availability of all presentations digitally after the educational project by providing free SD cards/Flash drives/DVDs and/or on a cloud drive is recommended. Examples can be found on www.duradexchange.org/.

Evaluation

Even though participants may not be used to feedback forms, their use is recommended to identify possible areas for improvement.

Discussion. Radiologists from HICs can contribute to the needs of their colleagues in lower- and middle-income countries (LMIC). This report gives insight into how we conducted our teaching efforts and provides others the opportunity to learn from our experiences. Because in general there is significant room for improvement in short-term medical missions [26], our

systematic approach serves this goal. The content of our analyses is specific to Azerbaijan, but our approach can help potential volunteers plan effective radiology education projects in other countries.

The strength of our overview is in the collaborative effort of visiting teachers, sending organization, and host professionals. This open approach is in line with a recent paper on the ethics of medical volunteerism [27].

A key finding of our data is that insight into the local culture and conditions of the healthcare system of a host country is essential. Practical and cultural differences are challenges for visiting volunteer medical teachers from HICs. In the first two education projects, the teacher was less equipped to fully serve the needs of the participants. Potential volunteers are therefore advised to invest in relations with host professionals to explore areas in which they can serve the educational needs of the participants. The logistical elements of a cross-cultural radiology education project such as traveling and accommodation are less critical for success compared with the careful design of the education project to meet the participants' needs. Knowledge of the healthcare system is needed to bridge the gap between colleagues with different geographic and cultural backgrounds. Medical knowledge exchange between HIC and LMIC education projects will benefit from initiatives to increase cultural competence of educators [28–31]. Cultural sensitivity is needed not only in the preparation and during the educational project but also afterwards. It is important that the educational material be available afterwards in the language of the participants. For example, see our website (www.duradexchange.org).

The survey among the participants helped gain insight on the usefulness of the third and fourth education projects. The third education project's results were significantly better for the items "This education project was a good fit with my previous experience and knowledge" and "This education project provided information applicable to my daily practice". The main difference between the education projects was the case-based practical approach of the third education project compared with the focus on quality management in the fourth education project. Even though quality management is vital for improvement, as a topic, it appeared to be less relevant than teaching on clinical topics relevant to daily practice. This illustrates the point that careful assessment of needs is es-

sential for successful knowledge exchange. There was no significant difference between the groups for the question "I would recommend this education project to my colleagues". In both groups, the participants agreed with this statement. Therefore, even though the content was not optimally adapted to the participants of the fourth education project, they appreciated it.

There is a great need for research on medical education in remote areas to optimize the available resources, as is illustrated in a paper on successes, challenges, and needs regarding rural health medical education [32]. Only 4 of the 20 publications that met their inclusion criteria were research papers; therefore, information is primarily available from expert opinions. Our work contributes to a more systematic approach to evaluating radiology education in LMIC settings.

An organization that promotes a systematic approach to strengthening the use of radiology in LMIC settings is RAD-AID International [33]. Their Radiology Readiness™ collaborative method is a stepwise and evidence-based approach, not only focused on training and continuing medical education but also addressing areas such as patient demographics, healthcare systems, human resources, and infrastructure [34]. In light of this approach, our systematic analyses of training need to be seen in a broader perspective.

Limitations

There was a limited availability of evaluation forms. At education projects 1 and 2, no evaluation forms were provided because there was only an informal evaluation within the organizing committee. At the third education project, 65 evaluation forms were received from 220 participants at the different institutions. At education project 4, the evaluation form was received back from only one of two institutions, from 10 out of 17 participants. The feedback of the participants of education projects 3 and 4 was general and not in detail for every specific lecture or workshop. In future education projects, evaluation forms could be more detailed, and the evaluation process itself should be carefully designed and culturally adapted.

The subjective nature of a qualitative evaluation has its limitations. Evidence-based medicine can be depicted as a pyramid, with the Systematic Reviews at the top. In that framework, the report of our experience in Azerbaijan is not highly rated. However, availability of evidence should be taken into account [35], and when high level evidence is not available,

lower level evidence can be useful.

Future research

In radiology, performance can be measured by different indicators, which can be divided into three groups: structure (how care is organized), process (the way things are done), and outcome (impact on patients' health). Using this framework for our project, we described how the education projects were organized and what was done. The outcome is only partially assessed by the feedback forms of the participants. Even though it is difficult to assess, future research should focus on the impact of educational MSTs on the quality of healthcare delivered. To have impact on outcome, the topics for education should

be carefully selected. A survey to assess meaningful topics prior to the preparation of the education project could contribute to this. This can be combined by an assessment afterward to evaluate the results of the training.

Conclusion. This systematic evaluation of serial cross-cultural radiology education efforts in Azerbaijan fills a gap in global health research. It is an example of evidence-based cross-cultural teaching, and it identified recommendations for future projects. A key finding is the importance of serving the host country's professionals by carefully assessing their needs. Educational efforts should be seen in the broader context of healthcare development.

REFERENCES – ƏDƏBİYYAT - ЛИТЕРАТУРА

1. GBD 2015 SDG Collaborators G 2015 S. Measuring the health-related Sustainable Development Goals in 188 countries: a baseline analysis from the Global Burden of Disease Study 2015. *Lancet* (London, England). 2016;388:1813–1850.
2. United Nations General Assembly. Transforming our world: The 2030 agenda for sustainable development. <https://sustainabledevelopment.un.org/content/documents/7891Transforming%20Our%20World.pdf>. New York; 2015.
3. Nilsson M, Griggs D, Visbeck M. Policy: Map the interactions between Sustainable Development Goals. *Nature*. 2016;534:320–322.
4. De Francisco Shapovalova N, Meguid T, Campbell J. Healthcare workers as agents of sustainable development. *Lancet Glob. Heal*. 2015;3:e249–e250.
5. Koon AD, Mayhew SH. Strengthening the health workforce and rolling out universal health coverage: The need for policy analysis. *Glob. Health Action*. 2013;6.
6. Lassi ZS, Musavi NB, Maliqi B, et al. Systematic review on human resources for health interventions to improve maternal health outcomes: evidence from low- and middle-income countries. *Hum. Resour. Health*. 2016;14:10.
7. Forsetlund L, Bjorndal A, Rashidian A, et al. Continuing education meetings and workshops: Effects on professional practice and health care outcomes. Forsetlund L, editor. *Cochrane Database Syst. Rev*. Chichester, UK: John Wiley & Sons, Ltd; 2009.
8. Satterlee WG, Eggers RG, Grimes DA. Effective medical education: insights from the Cochrane Library. *Obstet. Gynecol. Surv*. 2008;63:329–333.
9. Dionyssopoulos A, Karalis T, Panitsides EA. Continuing medical education revisited: theoretical assumptions and practical implications: a qualitative study. *BMC Med. Educ*. 2014;14:1051.
10. Goel S, Angeli F, Bhatnagar N, et al. Retaining health workforce in rural and underserved areas of India: What works and what doesn't? A critical interpretative synthesis. *Natl. Med. J. India*. 2016;29:212–218.
11. Meo SA, Hassan A, Aqil M, et al. Medical education research in GCC countries. *BMC Med. Educ*. 2015;15:8.
12. Sykes KJ. Short-Term Medical Service Trips: A Systematic Review of the Evidence. *Am. J. Public Health*. 2014;104:e38–e48.
13. Bido J, Singer SJ, Diez Portela D, et al. Sustainability assessment of a short-term international medical mission. *J. Bone Joint Surg. Am*. 2015;97:944–949.
14. Bhattacharyya O, Wu D, Mossman K, et al. Criteria to assess potential reverse innovations: opportunities for shared learning between high- and low-income countries. *Global. Health*. 2017;13:4.
15. Berry NS. Did we do good? NGOs, conflicts of interest and the evaluation of short-term medical missions in Sololá, Guatemala. *Soc. Sci. Med*. 2014;120:344–351.
16. Maki J, Qualls M, White B, et al. Health impact assessment and short-term medical missions: A methods study to evaluate quality of care. *BMC Health Serv. Res*. 2008;8:121.
17. Mollura DJ, Mazal J, Everton KL, et al. White paper report of the 2012 RAD-AID Conference on International Radiology for Developing Countries: planning the implementation of global radiology. *J. Am. Coll. Radiol*. 2013;10:618–624.
18. Boland GW, Duszak R. A Roadmap for Value-Based Payments. *J. Am. Coll. Radiol*. 2016;13:170–172.
19. Sarwar A, Boland G, Monks A, et al. Metrics for Radiologists in the Era of Value-based Health Care Delivery. *Radiographics*. 2015;35:866–876.
20. Meso P, Mbarika VWA, Sood SP. An Overview of Potential Factors for Effective Telemedicine Transfer to Sub-Saharan Africa. *IEEE Trans. Inf. Technol. Biomed*. 2009;13:734–739.
21. Wootton R, Wu W, Bonnardot L. Store-and-forward teleradiology in the developing world--the Collegium Telemedicus system. *Pediatr. Radiol*. 2014;44:695–696.
22. Merrell RC, Doarn CR. Sustainable Development Goals and Telemedicine. *Telemed. e-Health*. 2016;22:787–788.
23. Chalkidou K, Glassman A, Marten R, et al. Priority-setting for achieving universal health coverage. *Bull. World Health Organ*. 2016;94:462.
24. Mollura DJ, Lungren MP, editors. *Radiology in Global Health*. New York, NY: Springer New York; 2014.
25. Lungren MP, Nguyen BT, Kohli MD, et al. Educational Strategies and Volunteering in Global Health Radiology. *Radiol. Glob. Heal*. New York, NY: Springer New York; 2014. p. 93–109.

26. Martiniuk AL, Manouchehrian M, Negin JA, et al. Brain Gains: a literature review of medical missions to low and middle-income countries. BMC Health Serv. Res. 2012;12:134.
27. Stone GS, Olson KR. The Ethics of Medical Volunteerism. Med. Clin. North Am. 2016. p. 237–246.
28. Zaidi Z, Verstegen D, Vyas R, et al. Cultural hegemony? Educators' perspectives on facilitating cross-cultural dialogue. Med. Educ. Online. 2016;21:33145.
29. Blue V, Jernigan B, Hearod JB, et al. An Examination of Cultural Competence Training in US Medical Education Guided by the Tool for Assessing Cultural Competence Training HHS Public Access. J Heal. Dispar Res Pr. 2016;9:150–167.
30. Caldwell C. Cultural Competency in International Health Program Collaboration. Radiol. Glob. Heal. New York, NY: Springer New York; 2014. p. 85–92.
31. Lees J, Webb G, Coulston F, et al. Health Professional Workforce Education in the Asia Pacific. J. Public health Res. 2016;5:658.
32. Colon-Gonzalez MC, El Rayess F, Guevara S, et al. Successes, challenges and needs regarding rural health medical education in continental Central America: a literature review and narrative synthesis. Rural Remote Heal. 2015;15:3361.
33. Mollura DJ, Lungren MP. Introduction. Radiol. Glob. Heal. New York, NY: Springer New York; 2014. p. 1–3.
34. Azene EM. Radiology readiness™, research and relationship development. Radiol. Glob. Heal. Strateg. Implementation, Appl. New York, NY: Springer New York; 2014. p. 19–24.
35. Shaneyfelt T. Pyramids are guides not rules: the evolution of the evidence pyramid. Evid. Based. Med. 2016;21:121–122.

XÜLASƏ

MƏDƏNİYYƏTLƏRARASI MAARİFLƏNDİRMƏ PROYEKTLƏRİ ÇƏRÇİVƏSİNDƏ TİBBİ BİLİKLƏRİN MÜBADİLƏSİ: AZƏRBAYCANDA RADILOGİYANIN TƏDRİSİNİN STRUKTURLAŞMIŞ KEYFİYYƏT ANALİZİNƏ ƏSASLANMIŞ PRAKTİK YANAŞMA

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2015-ci ildə Ümumdünya Səhiyyə Təşkilatı davamlı inkişaf sahəsində öz məqsədləri barədə məlumat yaydı. Bu məlumat səhiyyədə ədalətsizliyin azaldılmasına və sağlamlığın yaxşılaşdırılmasına kömək edir. Dünyada ölkələr arasında böyük fərqlə bu suala cavab axtarılır: yüksək gəlirə malik (YGM) ölkələrin və aşağı və orta gəlirə malik (AOGM) ölkələrin səhiyyə işçiləri qlobal sağlamlığın keyfiyyətini artırmaq üçün vəhdət halında (xüsusilə də radioloqlar) necə fəaliyyət göstərə bilər? Təqdim edilmiş elmi işin **məqsədi** Azərbaycanda radiologiya sahəsində son zamanlar aparılan bir neçə mədəniyyətlərarası maarifləndirmə tədbirlərinin qiymətləndirilməsi və AOGM ölkələrdə keçirilən radiologiya və ümumiyyətlə tibb üzrə tədris üçün YGM ölkələrdən olan könüllülər tərəfindən praktiki tövsiyələrinin hazırlanması olmuşdur.

Tədqiqatın metodları. Dörd ardıcıl tədris proyektləri seriyasından biz iki sessiyanın qiymətləndirilmə formasını analiz etmişik. Bundan başqa, biz hər dörd tədris proyektni sistematik müqayisə yolu ilə və “Baza informasiyası, insanlar və praktika” kateqoriyalarında 21 punkt üzrə qiymətləndirmişik **Nəticələr.** Siyahıda olan bütün punktlara əlavə olaraq həm iştirakçıların, həm də mütəxəssislərin nəzər nöqtəsini özündə birləşdirən müddəə daxil edilmişdir. Qiymətləndirmə formaları göstərdi ki, parktiki radiologiyaya həsr edilmiş üçüncü tədris proyektı keyfiyyətin idarə olunması mövzusunda olan dördüncü proyektədən daha yüksək qiymətləndirilmişdir. Hər iki tədris proyektlərinin iştirakçıları bu cür proyektləri öz kolleqalarına tövsiyə edəcəklər. Bizim tərəfimizdən sistematik qiymətləndirmə, analiz və sorğu forması əsasında qısamüddətli mədəniyyətlərarası tədris proyektləri üçün tövsiyələr formalaşdırılmışdır. **Yekun.** Azərbaycanda ardıcıl mədəniyyətlərarası radioloji maarifləndirmə tədbirlərinin bu cür sistematik qiymətləndirilməsi səhiyyə sahəsində qlobal tədqiqatlarda boşluqları doldurur. Bu misal mədəniyyətlərarası tədrisin faktiki göstəricilərinə əsaslanır və onda gələcək proyektlər üçün tövsiyələr təyin edilmişdir. Əsas nəticə ondan ibarətdir ki, proyektı keçirən yerli tərəf öz mütəxəssislərinin ehtiyaclarını dəqiq olaraq qiymətləndirməli və bu ehtiyaclara uyğun olaraq, tədbiri təşkil etməlidir. Maarifləndirmə tədbirlərinə səhiyyənin inkişafının daha geniş konteksti yönündən baxmaq lazımdır.

Açar sözlər: davamlı tibbi təhsil, radiologiya, səhiyyədə fərqlər, əməkdaşlıq.

РЕЗЮМЕ

ОБМЕН МЕДИЦИНСКИМИ ЗНАНИЯМИ В РАМКАХ МЕЖКУЛЬТУРНЫХ ОБРАЗОВАТЕЛЬНЫХ ПРОЕКТОВ: ПРАКТИЧЕСКИЙ ПОДХОД, ОСНОВАННЫЙ НА СТРУКТУРИРОВАННОМ КАЧЕСТВЕННОМ АНАЛИЗЕ ПРЕПОДАВАНИЯ РАДИОЛОГИИ В АЗЕРБАЙДЖАНЕ

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В 2015 году Всемирная Организация Здравоохранения распространила сведения, касающиеся своих целей в области устойчивого развития. Эти сведения способствуют снижению несправедливости в здравоохранении и улучшению здоровья. В мире, имеющем большие различия между странами, не могут найти ответ на вопрос: что необходимо сделать работникам здравоохранения (и радиологии в частности) стран с высоким уровнем дохода (ВУД) и стран с низким и средним уровнем дохода (НСУД), чтобы в целом улучшить глобальное здоровье? **Целью** данной работы является оценка недавно проводимых в Азербайджане нескольких межкультурных образовательных проектов в области радиологии и разработка практических рекомендаций по радиологическому и медицинскому образованию в целом, проводимых в странах НСУД добровольцами из стран ВУД. **Методы.** Из серии четырех последовательных образовательных проектов мы проанализировали формы оценки двух сессий. Кроме того, мы оценили все четыре образовательных проекта путем систематического сравнения и анализа по 21 пункту в категориях «Базовая информация, люди и практика». **Результаты.** Ко всем пунктам в списке было добавлено отражение, которое включало точки зрения как посещающих, так и принимающих специалистов. Оценочные формы продемонстрировали, что третий образовательный проект с содержанием практической радиологии был оценен выше, чем четвертый образовательный проект по управлению качеством. Участники обоих образовательных проектов будут рекомендовать подобные проекты своим коллегам. На основании систематического оценивания, анализа и формы опросы нами были сформулированы рекомендации для краткосрочных межкультурных образовательных проектов. **Заключение.** Эта систематическая оценка последовательных межкультурных радиологических образовательных мероприятий в Азербайджане заполняет пробел в глобальных исследованиях в области здравоохранения. Этот пример основан на фактических данных межкультурного обучения, и в нем определены рекомендации для будущих проектов. Ключевым выводом является важность обслуживания специалистов принимающей страны путем тщательной оценки их потребностей. Образовательные мероприятия следует рассматривать в более широком контексте развития здравоохранения.

Ключевые слова: непрерывное медицинское образование, радиология, различия в здравоохранении, сотрудничество.

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