



REAL_AI Staff Student Survey (for submission)

Page 1: Introduction to Survey

An evaluation of Radiographer/Radiologist Education And Learning in Artificial Intelligence (REAL-AI)

You are invited to participate in an SoR CoRIPS funded Ulster University research project. The aim of the study is to determine the current education and training medical imaging staff receive on Artificial Intelligence (AI) across Europe and to facilitate discussion on how best to adapt the curriculum to encompass AI. The study also aims to identify what training and preparation is required for a new AI-powered work environment.

In this phase of the study (phase 1), we aim to identify your level of awareness of AI in daily life and in your work life, and to gauge your opinion on AI education for medical imaging staff. You can access the full study information [here](#).

For the purposes of this survey, AI can be defined as the theory and development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages¹.

References

1. Oxford English Dictionary. <https://www.oed.com/viewdictionaryentry/Entry/271625>. [Accessed 23 December 2022].

I understand that the survey is anonymous and that my participation is voluntary.

I am free to withdraw at any time, for any reason, without explanation.

I have read the participant information sheet above (also [here](#)).

1. I agree with the above statements and consent to participate in the study. *

Required

☐ Yes

☐ No

Page 2: About You

This section is to gather demographic and employment information. Please select the relevant option for each.

2. Please select the relevant answer from the following options: * *Required*

- ☐ I am a qualified diagnostic radiographer
- ☐ I am a qualified therapeutic radiographer
- ☐ I am dual-qualified
- ☐ I am a student on a diagnostic or therapeutic radiography degree course
- ☐ I am employed as an assistant practitioner in a Medical Imaging setting
- ☐ I am a radiologist
- ☐ I am a medical student/trainee radiologist
- ☐ None of the above

2.a. Where did you gain your qualification?

- ☐ Albania
- ☐ Andorra
- ☐ Austria
- ☐ Belarus
- ☐ Belgium
- ☐ Bosnia and Herzegovina
- ☐ Bulgaria
- ☐ Croatia
- ☐ Cyprus
- ☐ Czech Republic
- ☐ Denmark
- ☐ Estonia
- ☐ Finland

- ☐ France
- ☐ Georgia
- ☐ Germany
- ☐ Greece
- ☐ Hungary
- ☐ Iceland
- ☐ Ireland
- ☐ Israel
- ☐ Italy
- ☐ Jersey
- ☐ Latvia
- ☐ Liechtenstein
- ☐ Lithuania
- ☐ Luxembourg
- ☐ Malta
- ☐ Moldova
- ☐ Monaco
- ☐ Montenegro
- ☐ Netherlands
- ☐ North Macedonia
- ☐ Norway
- ☐ Palestine
- ☐ Poland
- ☐ Portugal
- ☐ Republic of Kosovo
- ☐ Romania
- ☐ Russia
- ☐ Serbia
- ☐ Slovakia
- ☐ Slovenia
- ☐ Spain

- ☐ Sweden
- ☐ Switzerland
- ☐ Turkey
- ☐ Ukraine
- ☐ United Arab Emirates
- ☐ United Kingdom
- ☐ Other

2.a.i. Please specify:

2.b. In which country are you studying?

- ☐ Albania
- ☐ Andorra
- ☐ Austria
- ☐ Belarus
- ☐ Belgium
- ☐ Bosnia and Herzegovina
- ☐ Bulgaria
- ☐ Croatia
- ☐ Cyprus
- ☐ Czech Republic
- ☐ Denmark
- ☐ Estonia
- ☐ Finland
- ☐ France
- ☐ Georgia
- ☐ Germany
- ☐ Greece

- ☐ Hungary
- ☐ Iceland
- ☐ Ireland
- ☐ Israel
- ☐ Italy
- ☐ Jersey
- ☐ Latvia
- ☐ Liechtenstein
- ☐ Lithuania
- ☐ Luxembourg
- ☐ Malta
- ☐ Moldova
- ☐ Monaco
- ☐ Montenegro
- ☐ Netherlands
- ☐ North Macedonia
- ☐ Norway
- ☐ Palestine
- ☐ Poland
- ☐ Portugal
- ☐ Republic of Kosovo
- ☐ Romania
- ☐ Russia
- ☐ Serbia
- ☐ Slovakia
- ☐ Slovenia
- ☐ Spain
- ☐ Sweden
- ☐ Switzerland
- ☐ Turkey
- ☐ Ukraine

- ☐ United Arab Emirates
- ☐ United Kingdom
- ☐ Other

2.b.i. Please specify:

2.c. In which country is the university affiliated with your training?

- ☐ Albania
- ☐ Andorra
- ☐ Austria
- ☐ Belarus
- ☐ Belgium
- ☐ Bosnia and Herzegovina
- ☐ Bulgaria
- ☐ Croatia
- ☐ Cyprus
- ☐ Czech Republic
- ☐ Denmark
- ☐ Estonia
- ☐ Finland
- ☐ France
- ☐ Georgia
- ☐ Germany
- ☐ Greece
- ☐ Hungary
- ☐ Iceland
- ☐ Ireland
- ☐ Israel

- ☐ Italy
- ☐ Jersey
- ☐ Latvia
- ☐ Liechtenstein
- ☐ Lithuania
- ☐ Luxembourg
- ☐ Malta
- ☐ Moldova
- ☐ Monaco
- ☐ Montenegro
- ☐ Netherlands
- ☐ North Macedonia
- ☐ Norway
- ☐ Palestine
- ☐ Poland
- ☐ Portugal
- ☐ Republic of Kosovo
- ☐ Romania
- ☐ Russia
- ☐ Serbia
- ☐ Slovakia
- ☐ Slovenia
- ☐ Spain
- ☐ Sweden
- ☐ Switzerland
- ☐ Turkey
- ☐ Ukraine
- ☐ United Arab Emirates
- ☐ United Kingdom
- ☐ Other

2.c.i. Please specify:

2.d. Where did you gain your qualification?

- ☐ Albania
- ☐ Andorra
- ☐ Austria
- ☐ Belarus
- ☐ Belgium
- ☐ Bosnia and Herzegovina
- ☐ Bulgaria
- ☐ Croatia
- ☐ Cyprus
- ☐ Czech Republic
- ☐ Denmark
- ☐ Estonia
- ☐ Finland
- ☐ France
- ☐ Georgia
- ☐ Germany
- ☐ Greece
- ☐ Hungary
- ☐ Iceland
- ☐ Ireland
- ☐ Israel
- ☐ Italy
- ☐ Jersey
- ☐ Latvia
- ☐ Liechtenstein
- ☐ Lithuania

- ☐ Luxembourg
- ☐ Malta
- ☐ Moldova
- ☐ Monaco
- ☐ Montenegro
- ☐ Netherlands
- ☐ North Macedonia
- ☐ Norway
- ☐ Palestine
- ☐ Poland
- ☐ Portugal
- ☐ Republic of Kosovo
- ☐ Romania
- ☐ Russia
- ☐ Serbia
- ☐ Slovakia
- ☐ Slovenia
- ☐ Spain
- ☐ Sweden
- ☐ Switzerland
- ☐ Turkey
- ☐ Ukraine
- ☐ United Arab Emirates
- ☐ United Kingdom
- ☐ Other

2.d.i. Please specify:

3. Please indicate your gender: * *Required*

- ☐ Male (including trans men)
- ☐ Female (including trans women)
- ☐ Non-binary
- ☐ Intersex
- ☐ I prefer not to say
- ☐ Other

3.a. Please specify:

4. Please indicate your age range from the choices below: * *Required*

- | | | |
|-----------------------------|-----------------------------|-----------------------------|
| ☐ 18-25 | ☐ 26-35 | ☐ 36-45 |
| ☐ 46-55 | ☐ 56-65 | ☐ >65 |

5. Please select the country in which you reside: * *Required*

5.a. Please specify:

6. Please indicate your highest level of qualification: * *Required*

- ☐ GCSE or equivalent
- ☐ A-Level or equivalent
- ☐ FE diploma
- ☐ Bachelor's Degree or equivalent
- ☐ Master's Degree
- ☐ Doctoral Degree (PhD)
- ☐ Doctor of Medicine (M.D.) or equivalent
- ☐ Fellow of the Royal College of Radiologists or equivalent
- ☐ Other
- ☐ Other

6.a. If you selected Other, please specify:

7. Please indicate your experience level in the field: * *Required*

- ☐ Undergraduate, year 1
- ☐ Undergraduate, year 2
- ☐ Undergraduate, year 3
- ☐ Undergraduate, year 4
- ☐ <1 year qualified
- ☐ >1 year but <6 years qualified
- ☐ >6 but <11 years qualified
- ☐ >11 but <20 years qualified
- ☐ >20 years qualified

8. In which area is your current main role? (select all that apply) * *Required*

- ☐ General radiography
- ☐ Ultrasound
- ☐ CT
- ☐ MRI
- ☐ Nuclear Medicine
- ☐ Mammography
- ☐ Interventional radiography
- ☐ Reporting
- ☐ Radiotherapy & Oncology
- ☐ DEXA/DXA
- ☐ Quality assurance/improvement
- ☐ Academic
- ☐ Clinical educator
- ☐ Management
- ☐ Student
- ☐ Professional body
- ☐ Industry partner
- ☐ Research
- ☐ Retired
- ☐ Other

8.a. Please specify:

Page 3: Current AI Awareness

This section is to gauge your current awareness of AI in clinical practice.

9. Have you completed any formal training or qualifications on AI? * *Required*

- ☐ Yes
- ☐ No

9.a. Please provide detail below:

10. Below are a list of statements about AI in radiology and radiotherapy applications.

	Select the statements you believe to be accurate.	I am unsure
	.	.
The AED in standard x-ray equipment is a form of AI.	☐	☐
X-ray equipment with an auto-positioning function to move the tube and/or detector is powered by AI.	☐	☐
AI algorithms can 'triage' a large volume of imaging examinations and prioritise those which need to be attended to more urgently.	☐	☐
AI can reduce CT and MRI scan times in a number of ways, one of which is by reconstructing data from shorter scans whilst maintaining diagnostic accuracy.	☐	☐

AI is being used to predict the likelihood of developing certain illnesses in later life.	☐	☐
AI algorithms can predict optimal positioning to spare organs at risk during certain radiotherapy treatments.	☐	☐
Referral vetting and protocol selection are tasks AI can complete.	☐	☐
AI can detect fractures on images of the appendicular skeleton.	☐	☐
AI can be used to organise patient lists and clinician's schedules.	☐	☐
Quantitative data can be extracted from medical images to predict treatment toxicity and patient outcomes.	☐	☐
Automated breathing instructions given to patients during CT/MRI scans are a function of AI.	☐	☐
Algorithms have been developed to detect a range of pathologies, including tuberculosis and Covid-19, on chest x-rays.	☐	☐
Quality assurance processes in radiotherapy can be managed by AI.	☐	☐
The need for implanted fiducials in prostate cancer patients has been reduced by developments in AI localisation.	☐	☐
Algorithms can perform multi-modal image registration using geometric, statistical and physical properties to precisely match features of a patient's various scans.	☐	☐

Page 4: Education on AI

This section aims to help us understand how best to shape future educational interventions on AI for the workforce.

11. Do you currently use AI technology in any aspect of your role? * *Required*

- ☐ Yes
- ☐ No
- ☐ Unsure

11.a. Give a brief description of the AI you use, for example, image interpretation, % confidence scores, heat maps, protocol selection

11.b. Did you receive training on the AI technology you use in your role?

- ☐ Yes
- ☐ No

11.b.i. Please detail the training you received:

11.b.ii. What training or support do you feel you would need in order to confidently work with the AI technology?

11.c. Do you understand how the AI functions, for example, how it calculates its percentage confidence level or segments a region of anatomy?

- ☐ Yes
- ☐ No

11.c.i. What training or support would you need in order to understand the AI technology?

12. Is there an 'AI Champion' or equivalent in your workplace? * *Required*

- ☐ Yes
- ☐ No
- ☐ I don't know

12.a. Do you think such a role is necessary? Why? * *Required*

12.b. Is this a role you would be interested in in the future? * *Required*

- ☐ Yes
- ☐ No
- ☐ Maybe

13. What level of knowledge do you think you will need to perform the duties of your role? * Required

- ☐ In-house training to be competent to operate the AI technology within my workplace only
- ☐ Basic knowledge to be competent in the core principles of AI e.g. understanding of concepts such as machine learning, deep learning, neural networks etc
- ☐ Moderate knowledge of AI principles i.e. basic knowledge plus fluency in the language and landscape of AI and an understanding of AI limitations
- ☐ Sufficient level of AI knowledge to be a clinical expert i.e. basic & moderate knowledge plus the ability to evaluate AI tools, understand and explain AI decisions, and share knowledge
- ☐ Level of knowledge that would allow me to contribute to development and testing of AI

14. At what stage of a clinician's career do you think AI education would be most appropriate? * Required

- ☐ At undergraduate level
- ☐ At postgraduate level
- ☐ I am unsure

14.a. Which method of delivery do you think would be most appropriate? (you can select multiple answers)

- ☐ A standalone AI module

- ☐ Aspects of AI incorporated throughout existing modules
- ☐ Clinical demonstrations
- ☐ A standalone module with reference to existing topics
- ☐ Optional classes
- ☐ Asynchronous learning materials
- ☐ Purely theoretical i.e. lectures/seminars
- ☐ All practical i.e. designing and testing an algorithm
- ☐ A mix of theory and practical learning
- ☐ Online webinars
- ☐ Other

14.a.i. Please specify:

14.b. What do you think would be the most appropriate format for postgraduate AI education?

- ☐ Short courses/CPD delivered online
- ☐ Short courses/CPD delivered in person
- ☐ Diploma
- ☐ Master's level
- ☐ Aspects of AI incorporated throughout existing postgraduate offerings
- ☐ Clinical demonstrations
- ☐ Other

14.b.i. If you chose 'Other' above, please specify here:

15. What topics and areas would you like to see covered within AI education? *(Please select all that apply)* * Required

- ☐ AI terminology
- ☐ Key concepts
- ☐ Computer science & programming
- ☐ AI development
- ☐ How to make AI work for you
- ☐ Explainable AI
- ☐ Practical applications of AI
- ☐ Ethics of AI
- ☐ Patient centredness and AI
- ☐ AI standards
- ☐ QA for AI
- ☐ Future applications of AI
- ☐ How to evaluate the performance of AI
- ☐ Role development and AI
- ☐ None, I trust the AI to work alongside me clinically if it has been regulated and approved. I don't need any further training in it
- ☐ Other

15.a. Please specify:

16. When RIS and PACS were first introduced, rather than train the entire workforce to be completely competent with the technology, a number of 'super-users' were trained as the gatekeepers for that technology within each site. Do you think this is feasible for the rollout of AI? * Required

☐ Yes

☐ No

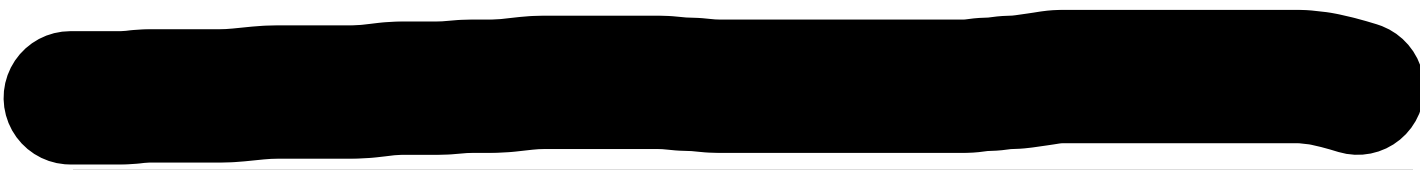
16.a. Please elaborate on your answer to Q16 * Required

16.b. What could be the benefit/constraints of such a solution? * Required

17. What other specialised roles/role progression do you foresee as AI is implemented more widely within the profession? * Required

Page 5: End of Survey

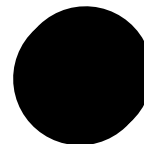
Thank you for taking the time to complete this survey. There may be opportunities for you to participate further in this research as part of focus groups to explore the findings of this study in more detail.



Key for selection options

5 - Please select the country in which you reside:

Albania
Andorra
Austria
Belarus
Belgium
Bosnia and Herzegovina
Bulgaria
Croatia
Cyprus
Czech Republic
Denmark
Estonia
Finland
France
Georgia
Germany
Greece
Hungary
Iceland
Ireland
Israel
Italy
Jersey
Latvia
Liechtenstein
Lithuania



Luxembourg
Malta
Moldova
Monaco
Montenegro
Netherlands
North Macedonia
Norway
Palestine
Poland
Portugal
Republic of Kosovo
Romania
Russia
Serbia
Slovakia
Slovenia
Spain
Sweden
Switzerland
Turkey
Ukraine
United Arab Emirates
United Kingdom
Other
