

Radiographers' Role in the Age of AI:

A Qualitative Comparative Multi Case Study

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Radiographers' role in the age of AI: A *qualitative comparative multi case study*

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 Open access

Why do this study?

- Studies have been done in Scandinavia and Europe, but Swedish participation has been lacking

A Nordic survey on artificial intelligence in the radiography profession – Is the profession ready for a culture change?  

127 males (range 111–130) (26.7%). Of the 421 respondents, 274 were from Denmark (65.1%), 86 from Norway (20.4%), 17 from Finland (4.0%) and 12 from Sweden (2.9%).

Radiographers' knowledge, attitudes and expectations of artificial intelligence in medical imaging  

Nordic radiographers' and students' perspectives on artificial intelligence – A cross-sectional online survey  

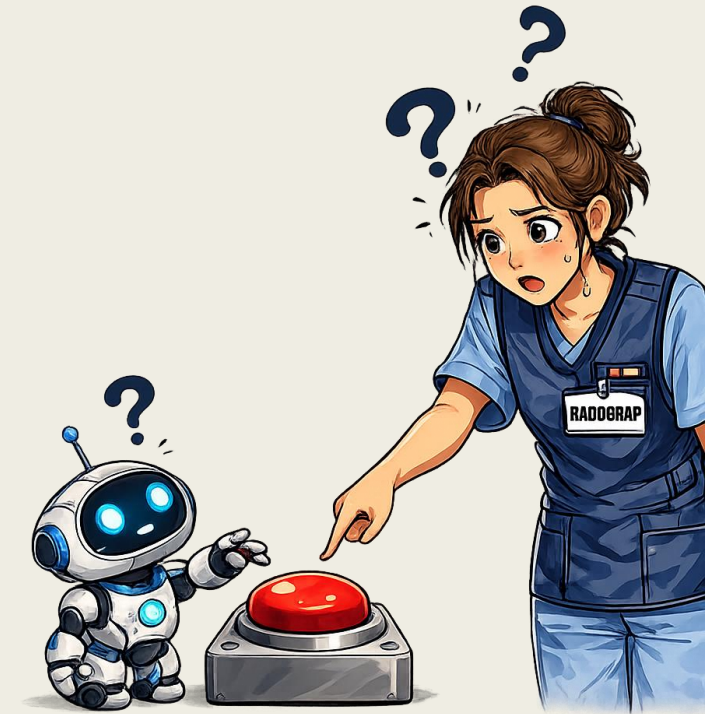
Origin of qualification		
Ireland		19
UK		13
Portugal		6
Italy		3
Malta		4
Spain		3
Other (Europe)		5
Other (Outside Europe)		5

Country		%
Denmark	379	64.7
Norway	120	20.5
Finland	45	7.7
Sweden	27	4.6
Other*	15	2.5

A cross-sectional online quantitative study targeting radiographers based in Europe

AI and Radiology

- Artificial intelligence has been present in radiology since the late 1980s, but its use has increased dramatically since 2015–2018 (Najjar, 2023; Hosny et al., 2018).
 - *Previously, AI processes were mainly in the background, with mixed success*
 - *Today, AI can do complicated tasks that rivals human capacity*
- It is still unclear which tasks are best suited to be delegated to “the machine”.
 - *It is important to study where AI works best and how different types of automation affect professions*



- Najjar R. (2023). Redefining Radiology: A Review of Artificial Intelligence Integration in Medical Imaging. *Diagnostics* (Basel, Switzerland), 13(17), 2760. <https://doi.org/10.3390/diagnostics13172760>
- Hosny, A., Parmar, C., Quackenbush, J., Schwartz, L. H., & Aerts, H. J. W. L. (2018). Artificial intelligence in radiology. *Nature reviews. Cancer*, 18(8), 500–510. <https://doi.org/10.1038/s41568-018-0016-5>

Brief description

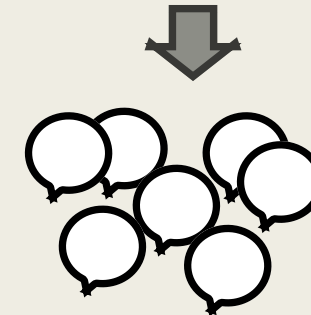
- Qualitative multicase study
 - *Interviews with personnel from radiology clinics*
- Three cases where each case is a hospital
 - *Focus; university hospitals*
- 18 informants
 - *Specialized radiographers*
 - *Researching radiographers*
 - *Researching radiologists*
 - *Department heads*
- Thematic analysis



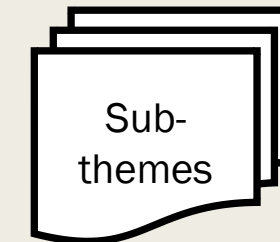
Brief description

- Thematic analysis
- Sub-themes and main themes were extracted from each case
- Each case were compared to each other to examine similarities and differences in attitudes and experiences

"A lot of colleagues I talk to feel the same way—that as radiographers, we tend to have a broad but fairly superficial understanding of AI. So, I think the first step is really to build a stronger foundation in how AI algorithms work, including their limitations, so we can use them properly. We need ongoing training in these new technologies and digital tools" (Informant 17).



Segments



Sub-themes



Themes

Results

- There were significant gaps in knowledge regarding AI implementation, and which AI models were used in clinical practice
- Radiographer-specific AI education was lacking at both undergraduate and postgraduate levels
- Participants often had to find information themselves or rely mainly on vendors
- Several participants noted that they were already very busy but were reluctant to delegate tasks to AI technology
- Many participants were positive about AI supporting daily work, but were unsure how or what needs it should address
- Radiographers felt they should be involved in the implementation process... but rarely were

"I believe the profession will change in some way. I'm fully convinced that AI will continue to develop, and that advanced functions will emerge that can take over parts of our work" (Informant 15).

"However, I believe there will be higher demands to keep up. Radiographers will be expected to truly understand the new developments" (Informant 10).

"A lot of colleagues I talk to feel the same way—that as radiographers, we tend to have a broad but fairly superficial understanding of AI. So, I think the first step is really to build a stronger foundation in how AI algorithms work, including their limitations, so we can use them properly. We need ongoing training in these new technologies and digital tools" (Informant 17).

"My belief is that AI is here, and it will have an impact. Regardless of what you want or do, you need to adapt to the situation and find new ways to contribute. AI will help with certain tasks, and then you should focus on what it's not helpful at, plain and simple" (Informant 5).

Recommendations/Implications for practice and research



heavy or manual tasks, but automation of important tasks may hurt the profession if not used thoughtfully.⁴⁵ This was shown in the interviews, where most informants indicated that they could delegate administrative work, such as booking patients or positioning the patients in the CT scanner but would prefer to control the imaging process and patient guidance in the lab.

Historically, boundary-crossing has been a key element in the evolution of the radiographer role, suggesting that new technologies may open up new areas for professional development.^{46,47} What is made clear through previous research and the interviews is that radiographers understand that some tasks may disappear, but responsibility for patient safety must remain central to the radiographer's role.¹⁵

Recommendations for practice and research

Implementation of innovation is often a slow process when there is few engaged people who motivates change in organizations, according to the literature and the interviews in this study.⁴² The findings indicate that radiographers are interested in participating in technological development, which may facilitate the implementation of AI when they are the end users.¹⁵ This engagement may also support further professional development, in a similar way to how the digitalization of radiology previously expanded the radiographer's role.⁴⁷

Strengthening radiographers' education and responsibilities related to AI could increase the number of engaged staff needed to drive innovation and support successful implementation. These arguments showcase the need for research into AI-specific educational materials tailored to radiographers.

Limitations

This study is a qualitative endeavour; as such, the results can only describe trends in the attitudes and opinions of radiographers in Sweden. The results cannot be generalised to the larger population unless a quantitative study is performed that can comple-

Ethics approval

Ethical approval
Ethical Review

Availability of data

Data require
thors upon rea
pean GDPR law

Author contributions

SLS: Concept
formal analysis
reviewing and
analysis, review
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Declaration of interest

During the p
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After using the
tent as needed
publication.

Funding

This research
Regional Research

What does the findings mean?

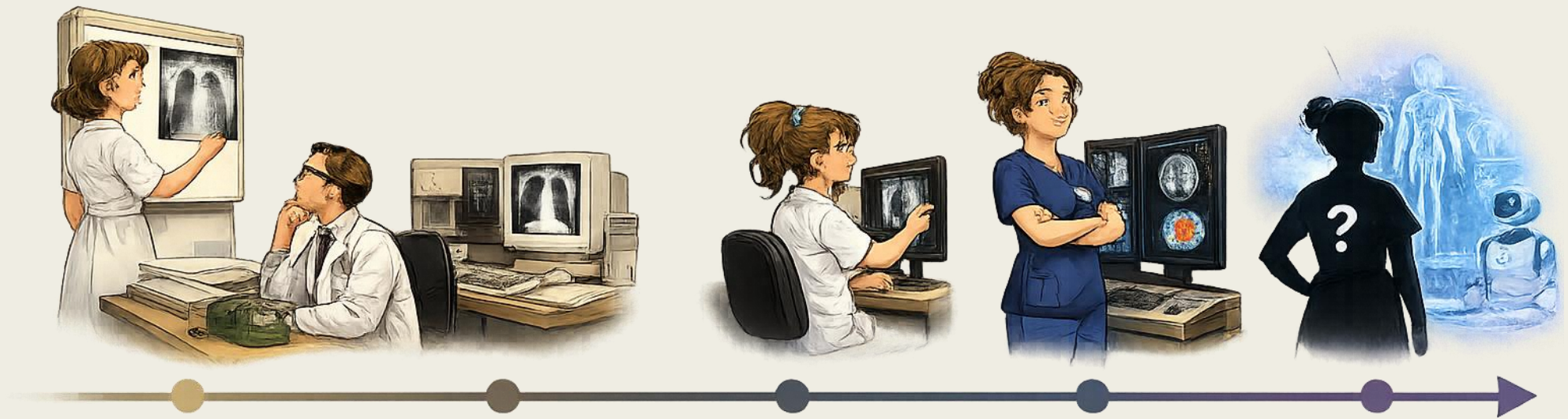
- Applies beyond radiographers
 - *Radiologists, nurses, administrative personnel*
- Need for structured AI education
 - *Self-learning → biased understanding*
- Mismatch between perceived and actual knowledge
 - *Those who consider themselves knowledgeable are often not (Rainey et al., 2021)*
- Changing roles and competencies
 - *Radiographers to take part in AI development and validation?*



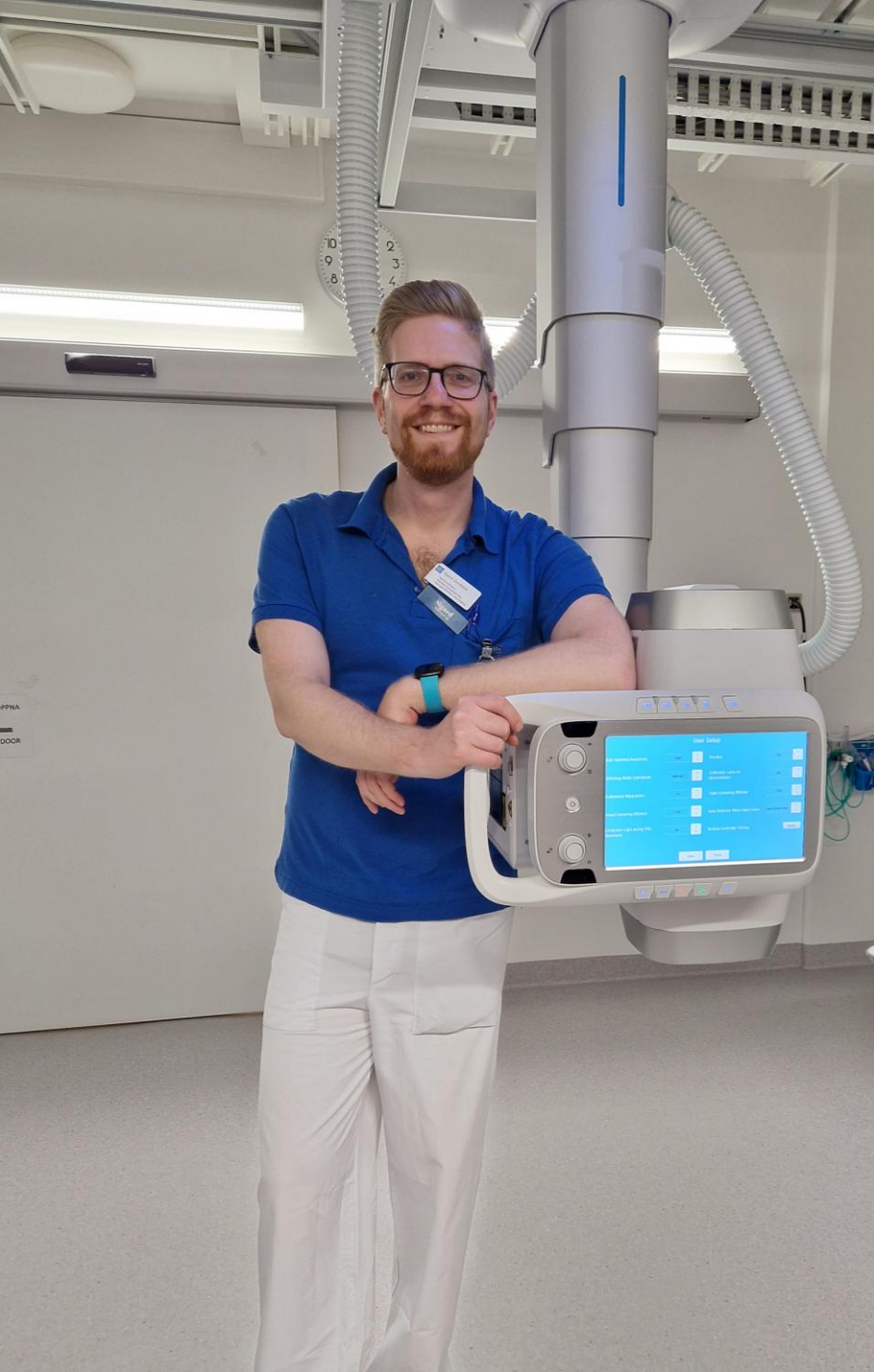
Needs & Development

- AI often vendor-driven, not need-driven
- Needs defined too broadly (not locally)
- Staff involvement and education are critical
- Leads to better adoption and more relevant solutions
- Diffusion of Innovation
 - “According to *diffusion of innovation* theory, resistance to new technologies is expected when information, education or motivation are lacking” Dearing, 2010).





"We need to find our place in all of this... this development. And not just walk around thinking everyone will be replaced. Sure, a lot of my tasks might be taken over, but that doesn't mean we as radiographers will disappear. There will always be new tasks, new challenges." (Informant 17).



That's it

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