

Understanding IT in Healthcare: Relevance and Training Needs of IT in Private Medical Practice

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Abstract. Background: The integration of Information Technology (IT) into private medical practice is crucial in modern healthcare. Physicians managing office-related IT without proper knowledge risk operational inefficiencies and security. Objectives: This study determines the relevance of specific IT topics in medical practice and identifies the training needs of physicians for enhancing IT competencies in healthcare. Methods: In March 2023 a cross-sectional online survey was conducted with physicians comprising nine IT-related topics in Tyrol, Austria. Results: The survey results highlighted a strong perceived relevance and high demand for IT education among physicians working in their medical practice, especially in areas of core medical IT and security. The majority of responses indicated high relevance (76.7%) and high demand (69.7%) for IT topics in medical practice. Conclusion: The findings underscore a significant need for targeted IT training and support in medical practices, particularly in areas related to the medical practice and security. Addressing these needs could lead to improved healthcare delivery and better management of technological resources in the healthcare sector.

Keywords. Information Technology, Digital Health, Education

1. Introduction

The rapid digitalization of the healthcare sector has led to far-reaching changes in recent decades. Whether it is the electronic patient record or innovative telemedical procedures: The integration of information technology into the medical field promises to optimize patient care and make clinical processes more efficient [1,2]. Numerous studies emphasize the possibility of using these advances, among others, to improve the quality of care and extend access to healthcare services even in remote regions [3]. However, despite these recognizable benefits, a key challenge remains in the adequate knowledge and digital skills of medical staff.

Implementing new technologies in healthcare can be challenging [4], particularly for physicians in medical practice who often lack Information Technology (IT) knowledge and proper support. This can lead to errors, inefficient use of technology, and user frustration. Further, physicians working in private practice are fully responsible for managing their office's IT systems, making them directly accountable for any security issues. This necessity for IT proficiency is vital not only for operational efficiency but

also for patient care, telemedicine services, practice management, medical research, and ensuring cybersecurity. Consequently, there is a pressing need for effective IT training and support in the healthcare sector, especially for those in medical practice.

Building on these challenges, our study aims to precisely define and understand the scope of these issues. Specifically, the objective is to determine the relevance of certain IT topics in medical practice and identify the corresponding training needs for private medical practitioners. This focus will help in developing targeted strategies to enhance IT competency in healthcare settings, ensuring that physicians are well-equipped to manage their technological requirements efficiently and securely.

2. Methods

This study employed a cross-sectional survey approach to assess the significance of IT and the associated training requirements for physicians in medical practice. The online questionnaire assessed nine healthcare-related IT topics:

1. IT Infrastructure for Core Medical Activities: Systems for medical treatment and documentation.
2. Non-medical Specific IT Infrastructure: General practice organization systems including office tools and network management.
3. Digital Processes and Procedures: Automation of medical practice processes and efficiency tools.
4. Healthcare Interoperability (ELGA): Health information exchange and connection with other healthcare providers.
5. Data Protection: Compliance with GDPR and reliable handling of patient data.
6. IT Security: Measures against cyber threats and maintaining technical security.
7. Telemedicine: Digital physician-patient interaction and remote healthcare services.
8. Future Trends: Emerging technologies like artificial intelligence (AI), cloud services, and health apps.
9. Sustainability in IT: Energy-efficient and resource-conserving IT practices.

Participants rated the relevance of each area for their work and the demand of further training on a 5-point-likert scale of 1 (very relevant/high demand) to 5 (not relevant/no need). The questions concerning the training for each topic were only available when the answer of the related relevance for this topic was rated with 1-3. In addition, the survey collected general office information, such as the type of practice (affiliations to one or multiple statutory health insurances), the specialty (general practitioner or specialist or both), the number of years in the practice and the size of the team. The survey also explored preferences for online training features, including free training, continuing education points, and customizable options.

Initially, the survey was tested with a small group of medical professionals (n=20) during a professional meeting. Since this preliminary trial did not result in any further needed modifications, and all questions were deemed understandable and relevant, the results of this initial survey were incorporated into the final analysis. This integration ensured that the survey was refined and validated by a representative sample before wider distribution.

The survey was implemented as an online survey using LimeSurvey [5] and distributed to all registered physicians (general physicians and specialists) in Tyrol, Austria (approximately 1,400) via email through the Tyrolean Medical Association. The

survey remained open for three weeks in March 2023. The raw data was exported from LimeSurvey in CSV format and further processed in Jupyter Notebook [6], facilitating a comprehensive analysis that encompassed data cleaning, transformation, and visualization to derive essential qualitative and quantitative insights..

3. Results

Out of 235 initiated surveys, 199 were completed and submitted. To ensure a robust analysis, only these fully completed surveys were considered for further analysis, filtering out any incomplete responses.

The survey results indicated a significant high perceived relevance of IT across all examined domains in the medical practice setting with the highest scores in topics for general medical IT comprising the infrastructure for core medical activities and security. Notably, most of the responses (76.7%) rated the relevance for all topics within a range of 1-2 (high relevance) as depicted in Figure 1 and Figure 2, demonstrating a strong acknowledgment of IT's importance in medical practice.

Training needs mirrored this trend, with 69.7% of responses falling within the 1-2 range (high demand), underscoring a substantial interest in further IT education among practitioners. However, a divergence was observed in the relative significance attributed to certain topics. Specifically, themes for Telemedicine, Future Trends and Sustainability in IT were consistently deemed less relevant compared to other areas. This was reflected both in their lower relevance scores and in the diminished priority assigned to them in the context of further training. Although the topic of Future Trends shows lower relevance, the corresponding need for training is considerably higher, suggesting a disparity between current perceptions of importance and the actual demand for skill development in this area.

Of particular note were the areas of core medical IT and security, which emerged as the most relevant topics. IT Security, in detail, not only garnered high relevance ratings but also displayed a pronounced demand for training. This finding suggests a heightened awareness and concern among physicians regarding the security aspects of IT in their practices. The substantial interest in training for IT security likely reflects the escalating challenges and risks posed by cyber threats in the healthcare sector even for medical practices.

An interesting pattern emerged across different experience groups of physicians, where experience is measured along the years of working as a physician. The most significant disparities related to experience were in data protection relevance (less than 1 year of experience: 1.2; over 20 years of experience: 2.0) and in IT training needs in the area of processes (less than 1 year of experience: 1.1; over 20 years of experience: 2.0), though these differences were not substantial. Similarly, the comparison between general practitioners and specialists showed a consistent pattern with little variation between the groups. The study participants reported their associations with Austria's statutory health insurers operating in Tyrol, revealing a balanced representation among the three national insurers - BVAEB (62.8%), ÖGK (61.8%), SVS (63.8%) [7] - and the Tyrol-specific public health insurance, KUF (70.4%).

The preferences for training options were quite clear: Nearly 99% (n=198) of participants expressed their desire for free training courses and the same amount preferred online training courses. Additionally, 61% (n=121) indicated that earning continuing education points as proposed by the National Medical Association for such

training would be important to them. 15.1% of respondents (n=30) identified other significant criteria as free text for training, with a notably high frequency of references to “practice relevance”.

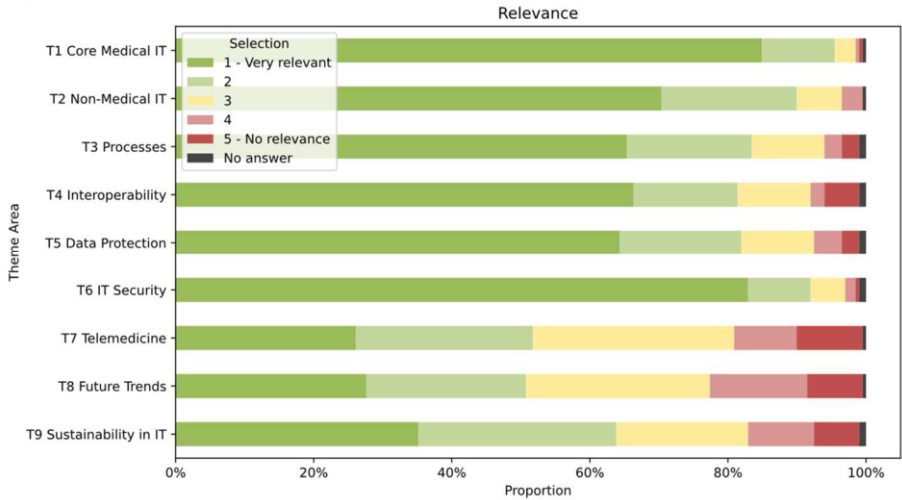


Figure 1. Stacked bar chart illustrating the perceived relevance of nine healthcare IT topics in a physician's practice. Responses were scored on a scale from 1 (indicating high relevance) to 5 (indicating no relevance), with an option for no response.

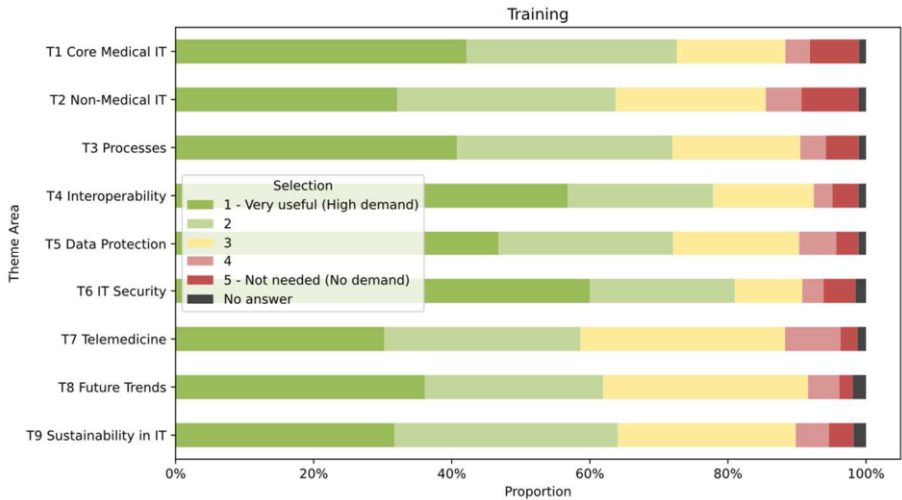


Figure 2. Stacked bar diagram depicting the training needs of physicians across various healthcare IT topics. Each topic's demand is rated on a scale from 1 (high demand for training) to 5 (no training need), visually represented through stacked bars.

4. Discussion

The analysis of our online survey yielded insightful findings regarding the IT competence and training needs of medical practices.

4.1. Discussion of Methods

The use of an online survey realized through LimeSurvey, provided a cost-effective and quick way to reach a large number of physicians. This type of data collection has proven popular in recent literature as a means of capturing opinions and perspectives from practitioners [8]. Despite being disseminated through the medical association, a typically credible and influential entity, our study experienced a lower response rate than expected. The reduced rate of participation in our study, despite the involvement of a respected professional body, could introduce potential biases. This outcome suggests that factors other than the source's familiarity might influence the willingness of respondents to participate in online surveys.

Analyzing the data with Jupyter Notebook allowed for a reproducible data analysis. Jupyter notebooks are well known in the research community for their ability to integrate both code and annotative text [6]. This not only provides a transparent representation of the data analysis but also a way for other researchers to reproduce or even extend the analysis. The topics chosen for investigation were meticulously selected to encompass a broad spectrum of information technology aspects relevant to medical practice, guided by established benchmarks for initiating a new practice [9] and the overarching field of medical informatics. Nevertheless, the number or specificity of topics might be a limitation. Future studies could integrate additional or different topic areas based on the evolving needs and trends in medical informatics [10,11].

In conclusion, the method of soliciting feedback directly from physicians regarding their preferences for training offerings has provided valuable insight also into how the training should best be offered and organized. The vast preference for free online training suggests that accessibility and costs are important factors that need to be considered.

4.2. Discussion of Results

It is notable that the vast majority of respondents consider topics such as the general relevance of medical IT and security to be particularly important. This is consistent with findings from previous studies, which also highlighted the increasing importance of digitalization in the healthcare industry [12,13].

The fact that the topic for future trends appeared less relevant but showed a high need for educational training is interesting and could indicate a discrepancy between the current level of knowledge and the desire to be prepared for future developments. This finding is also reflected in other studies, which emphasized that medical staff recognize the importance of future technology trends, but often do not feel adequately prepared for them also in how to integrate them in medical practice [4].

The fact that the relevance and need for training decreased with years of service is also a revealing finding. It could indicate that experienced doctors either feel more confident in their current knowledge or are less open to technological innovations. This is consistent with studies suggesting that acceptance and adaptation to new technologies can often vary with age and experience [14]. It is also worth noting that there were hardly any differences in the ratings between general practitioners and specialists.

Finally, the high preference for free online training and desire for continuing education credits is not surprising, given current trends in medical education and the limited time for physicians. Previous studies have already pointed to the growing popularity of online courses [11].

Overall, these findings underscore the need to continuously assess and adapt medical IT training needs to ensure that medical staff are best prepared to meet the challenges of digital transformation even in medical practices. Future studies should investigate appropriate learning strategies, including e-learning, to effectively meet the diverse IT training needs of physicians in the digital health landscape.

Acknowledgments

This work was supported by the Tyrolean Medical Association (Ärzttekammer für Tirol).

References

- [1] D. Setyadi, and M. Nadjib, The Effect of Electronic Medical Records on Service Quality and Patient Satisfaction: A Literature Review, *Journal Research of Social Science, Economics, and Management*. **2** (2023) 2780–2791. doi:10.59141/jrssem.v2i12.500.
- [2] OECD, and E. Union, Adoption of Electronic Medical Records, OECD, Paris, 2022. doi:10.1787/76c7b6a2-en.
- [3] A. Haleem, M. Javaid, R.P. Singh, and R. Suman, Telemedicine for healthcare: Capabilities, features, barriers, and applications, *Sens Int.* **2** (2021) 100117. doi:10.1016/j.sintl.2021.100117.
- [4] J. Konttila, H. Siira, H. Kyngäs, M. Lahtinen, S. Elo, M. Kääriäinen, P. Kaakinen, A. Oikarinen, M. Yamakawa, S. Fukui, M. Utsumi, Y. Higami, A. Higuchi, and K. Mikkonen, Healthcare professionals' competence in digitalisation: A systematic review, *J Clin Nurs.* **28** (2019) 745–761. doi:10.1111/jocn.14710.
- [5] LimeSurvey GmbH, LimeSurvey — Free Online Survey Tool, (n.d.). <https://www.limesurvey.org/de> (accessed January 25, 2024).
- [6] T. Kluyver, B. Ragan-Kelley, F. Pérez, B. Granger, M. Bussonnier, J. Frederic, K. Kelley, J. Hamrick, J. Grout, S. Corlay, P. Ivanov, D. Avila, S. Abdalla, C. Willing, and Jupyter Development Team, Jupyter Notebooks—a publishing format for reproducible computational workflows, 2016. doi:10.3233/978-1-61499-649-1-87.
- [7] Federal Ministry of Social Affairs, Health, Care and Consumer Protection, Structural Reform of the Social Insurance System, (n.d.). <https://www.sozialministerium.at/en/Topics/Social-Affairs/Social-Insurance/Structural-Reform-of-the-Social-Insurance-System.html> (accessed January 29, 2024).
- [8] C. Audibert, D. Glass, and T.P. Johnson, Method and transparency of online physician surveys: an overview, *Survey Methods: Insights from the Field (SMIF)*. (2020). doi:10.13094/SMIF-2020-00001.
- [9] Handbuch zur Gründung einer PVE, (2022). https://primaerversorgung.gv.at/sites/default/files/2022-09/20220912_Gr%C3%BCndungshandbuch_Version%20f%C3%BCr%20PPV_0.pdf (accessed January 19, 2024).
- [10] S. Tomar, M. Gupta, M. Rani, and H.S. Shyam, Healthcare Digitalisation: Understanding Emerging Technological Trends, in: 2023 9th International Conference on Advanced Computing and Communication Systems (ICACCS), 2023: pp. 2459–2463. doi:10.1109/ICACCS57279.2023.10113106.
- [11] I.A. Scott, T. Shaw, C. Slade, T.T. Wan, C. Coorey, S.L.J. Johnson, and C.M. Sullivan, Digital health competencies for the next generation of physicians, *Intern Med J.* **53** (2023) 1042–1049. doi:10.1111/imj.16122.
- [12] J.P. DeMello, and S.P. Deshpande, Factors Impacting Use of Information Technology by Physicians in Private Practice, *IJHISI.* **7** (2012) 17–28. doi:10.4018/jhisi.2012040102.
- [13] F. Vogt, F. Seidl, G. Santarpino, M. van Griensven, M. Emmert, G. Edenharter, and D. Pörringer, Healthcare IT Utilization and Penetration among Physicians: Novel IT Solutions in Healthcare - Use and Acceptance in Hospitals, *Eur Surg Res.* **59** (2018) 100–113. doi:10.1159/000490241.
- [14] T. Nimjee, E. Miller, and S. Solomon, Exploring Generational Differences in Physicians' Perspectives on the Proliferation of Technology within the Medical Field: A Narrative Study, *Healthc Q.* **23** (2020) 53–59. doi:10.12927/hcq.2020.26172.