

An exploratory study of clinical, technological, and soft skills competencies in training courses for healthcare professionals

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Submitted to: JMIR Preprints
on: September 25, 2025

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Abstract

This exploratory study examined how clinical, digital, and soft skills are addressed in the training of healthcare professionals and how these competencies relate to perceived professional development. We analyzed 1,632 post-module evaluations from a satisfaction questionnaire, classifying modules by competency type and responses by participants' professional profiles.

The results indicate that perceptions of training differ by both professional group and competency type. Doctors tended to rate the usefulness of materials, confidence gained, and achievement of objectives more positively than nurses, administrative staff, and other professionals, particularly in modules focused on clinical and soft skills. By contrast, digital-skills modules received lower and more homogeneous evaluations across groups.

These findings suggest that training programs should combine technical content with participants' lived experiences, ensuring both knowledge acquisition and relevance to daily practice. We outline methodological recommendations for tailoring content and pedagogy to distinct professional profiles and for developing contextualized and sustainable training in the healthcare field.

(JMIR Preprints 25/09/2025:84853)

DOI: <https://doi.org/10.2196/preprints.84853>

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Original Manuscript

An exploratory study of clinical, technological, and soft skills competencies in training courses for healthcare professionals

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Declarations

Funding: Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the Health and Digital Executive Agency (HaDEA). Neither the European Union nor the granting authority can be held responsible for them.

Conflicts of Interest: The authors declare no conflicts of interest.

Ethical Approval and Informed Consent: Participation in the eHospital4Future survey was voluntary. Respondents received information about the study objectives, anonymity of data, and their right to withdraw at any time. Informed consent was obtained electronically prior to completing the questionnaire.

Acknowledgements: This paper is supported by the eHospital4Future project, funded by the European Union under the Horizon Europe programme. The authors gratefully acknowledge the contributions of all project partners and stakeholders involved in advancing digital health education.

Abstract

This exploratory study examined how clinical, digital, and soft skills are addressed in the training of healthcare professionals and how these competencies relate to perceived professional development. We analyzed 1,632 post-module evaluations from a satisfaction questionnaire, classifying modules by competency type and responses by participants' professional profiles.

The results indicate that perceptions of training differ by both professional group and competency type. Doctors tended to rate the usefulness of materials, confidence gained, and achievement of objectives more positively than nurses, administrative staff, and other professionals, particularly in modules focused on clinical and soft skills. By contrast, digital-skills modules received lower and more homogeneous evaluations across groups.

These findings suggest that training programs should combine technical content with participants' lived experiences, ensuring both knowledge acquisition and relevance to daily practice. We outline methodological recommendations for tailoring content and pedagogy to distinct professional profiles and for developing contextualized and sustainable training in the healthcare field.

Key words: Clinical competencies; Digital health skills; Soft skills; Professional development; Training programs; Healthcare workforce

1. Introduction

1.1. Overview and challenges of healthcare personnel in 2025

In a constantly evolving healthcare context, the continuous training of healthcare personnel including doctors, nurses, and other health professionals has become a key pillar in ensuring safe, efficient, and patient-centered care (King et al., 2021; Magwenya et al., 2023). However, today's health systems face structural challenges that threaten their sustainability and quality. Among these challenges are the shortage of healthcare professionals, the accelerated aging of both the general population and the healthcare workforce itself, the digital transformation of health systems, and the growing demand for hybrid profiles that integrate clinical and technological competencies (European Parliament, 2025; Zapata et al., 2023).

The shortage of healthcare personnel has become a growing concern in Europe and beyond. According to the World Health Organization (WHO), by 2030 the European Union could face a shortfall of 4.1 million healthcare workers due to the mass retirement of professionals and insufficient training of new specialists (Zapata et al., 2023). Relatedly, Eurostat projects that the population over 65 will exceed 30% by mid-century, which will intensify the demand for care (Eurostat, 2024). Furthermore, the WHO emphasizes the need to prepare health systems to respond to an aging population with greater care needs (World Health Organization, 2024a).

Digital transformation is increasingly recognized as a key factor in strengthening the resilience and efficiency of health systems. The WHO's Global Strategy on Digital Health 2020–2025 highlights that the integration of technologies such as artificial intelligence, telemedicine, and automation will be essential to improving access, quality, and safety in healthcare delivery (World Health Organization, 2020). This transition requires not only robust technological infrastructures but also professionals capable of performing hybrid roles, combining clinical competencies with digital and data management skills (Longhini et al., 2022).

Within this framework, the Global competency and outcomes framework for the essential public health functions (WHO, 2024b) outlines comprehensive approaches to strengthening health systems, emphasizing the development of cross-cutting capabilities, interprofessional collaboration, and adaptability to complex and changing environments. At the regional level, the Pan American Health Organization (2024) has further advanced these perspectives through its strategy to strengthen the essential public health functions, aligning them with the specific challenges and contexts of the Americas.

1.2. Clinical competencies: clinical reasoning, digital literacy, and soft skills

Contemporary healthcare requires professionals with hybrid competencies integrating solid clinical knowledge, advanced digital literacy, and core interpersonal skills. In a context marked by the digital transformation of health services, digital literacy, which encompasses the use of clinical technologies, critical understanding of data, and communication in digital environments has emerged as a strategic competency to ensure effective, safe, and patient-centered care. According to a recent systematic review, these competencies are structured into technical, methodological, social, and personal dimensions, and are essential for adapting to complex and interconnected healthcare environments (Longhini et al., 2022).

Soft skills such as empathy, teamwork, and stress management directly influence the quality of care (Sancho-Cantus et al., 2023; van Kessel et al., 2022). These competencies are essential for shaping a professional profile capable of leading in dynamic healthcare settings.

In parallel with these interpersonal skills, the growing digitalization of the sector has driven the need to develop more sophisticated technological competencies, ranging from the critical use of digital tools to the ethical understanding of health data. Recent studies emphasize that digital competencies demand a comprehensive approach combining technical, ethical, communicative, and collaborative dimensions whose systematic integration is crucial to addressing current challenges in health systems (Mainz et al., 2024). The digital transformation of health systems has accelerated the need for advanced technological competencies among healthcare personnel. For example, the *WHO's Global Strategy on Digital Health 2020–2025* identifies priorities such as the integration of digital technologies, system interoperability, and the training of professionals for ethical, safe, and efficient use of digital health (World Health Organization, 2020).

In relation to the above, the expansion of telehealth, artificial intelligence, and clinical data analysis demands continuous updating of digital competencies among healthcare professionals. These competencies include not only technical skills, such as interpreting large volumes of data and managing virtual platforms but also understanding AI algorithms and ethically handling sensitive data. Case studies in care coordination show that artificial intelligence can enhance interoperability and efficiency but also highlight the need for professionals to strengthen their technological and digital management skills to ensure safe, high-quality care delivery (Bajwa et al., 2021).

Several digital competency frameworks have established profiles and tools to guide training in digital health. Internationally, the *European Commission's DigComp 2.2* framework defines five key areas

(information and data, communication, content creation, safety, and problem-solving), incorporating examples related to AI and data security, thus providing a multidimensional foundation for professional training (World Health Organization, 2024b). At the regional level, the *COMPDIG-Health project* in Catalonia adapts these principles to the local context through the implementation of an accreditation test to assess and certify the digital skills of more than 800 healthcare professionals, highlighting the need for differentiated training according to professional profiles (Reixach et al., 2022). At the transnational level, the *European SUSa project* (Sustainable Healthcare with Digital Health Data Competence), funded by the European Union, promotes the upskilling and reskilling of healthcare professionals through training programs in artificial intelligence, clinical data analysis, and interoperability, aiming to meet the growing technological demands of the European healthcare system (University of Oulu, 2024).

In line with these definitions, the study by Mainz et al. (2024) confirms that healthcare professionals' digital competencies encompass technical, methodological, social, and personal dimensions, and highlights that current measurement tools still do not fully reflect this complexity. Taken together, the conceptual frameworks, institutional initiatives, and training experiences reviewed point to a key conclusion: the effective integration of these technological competencies improves efficiency, safety, and quality in care delivery. However, for this impact to materialize, strong institutional strategies for training, evaluation, and accreditation are needed, as well as the continuous adaptation of curricular content to emerging technological advances (Longhini et al., 2022).

Beyond clinical and technological competencies, the development of soft skills such as collaboration and humanization of care is equally essential. Existing literature highlights gaps in the way soft skills are conceptualised and taught in healthcare, particularly in relation to communication, teamwork, and compassionate care (Daly et al., 2022). This approach is consistent with studies that document that, despite their recognized importance, training in communication, empathy, and teamwork remains limited or inconsistent in some healthcare disciplines, such as medical radiation science (Ofori-Manteaw, 2025).

1.3. Soft Skills

The development of soft skills, such as clinical communication, teamwork, empathy, and leadership, is essential to ensuring patient safety and optimizing care outcomes. According to a review by O'Daniel and Rosenstein (2008), failures in professional communication are a leading cause of medical errors, while

effective communication is associated with improved patient safety and satisfaction. Similarly, teamwork in healthcare settings is associated not only with better clinical outcomes but also with improved professional quality of life and a more sustainable work environment (Nguyen Howell et al., 2023).

The development of empathy, recognized as essential in the therapeutic relationship, fosters humanized care, reduces professional stress, and strengthens the therapeutic bond. A systematic review showed that specific training in empathy not only supports the personal growth of healthcare professionals but also directly improves patient care (Winter et al., 2022). Likewise, a recent meta-analysis in health students reported a moderate effect (standardized mean difference = 0.45) following training interventions, highlighting the need to incorporate structured and continuous programs to sustain these improvements in real clinical settings (Schwartzkopf et al., 2025). Finally, another review confirms that the relationship between empathy and burnout is inverse: the greater the empathy, the lower the emotional exhaustion, supporting the idea that empathy training contributes both to professional well-being and person-centered care (Howick et al., 2024). These studies demonstrate that greater empathy is associated with better clinical outcomes, higher patient satisfaction, and reduced burnout among healthcare professionals (Nembhard et al., 2023).

Furthermore, a qualitative analysis of training experiences shows how integrating communicative and collaborative skills through empathy strengthens professionals' well-being and contributes to improving care quality. A qualitative study conducted in hospital and academic settings identified key factors that facilitate or hinder the development of empathy, including the work environment, professional identity, and prior experiences, highlighting that well-designed training programs can enhance both clinical competence and emotional well-being among professionals (Yu et al., 2022).

Lastly, the literature on health leadership supports the idea that promoting collaborative leadership along with continuous interprofessional education is critical to consolidating these competencies across clinical and educational settings (Bornman & Louw, 2023).

In summary, soft skills remain vital in modern healthcare, where professionals must adapt to digital change, collaborate across disciplines, and make evidence-based decisions (Socha-Dietrich, 2020).

1.4. Interprofessional Education

Interprofessional education has become a key strategy for the development of soft skills that are fundamental to safe and patient-centered care. These programs allow students from different disciplines to work together, promoting mutual respect and a shared understanding of responsibilities. However, the implementation of interprofessional education still faces substantial obstacles, including logistical challenges, academic overload, professional hierarchies, and cultural barriers, which may limit its educational impact (Patel et al., 2025; Rawlinson et al., 2021).

For successful implementation of interprofessional education, essential considerations have been discussed, ranging from needs assessment to continuous program evaluation. Key factors include the active involvement of faculty from different disciplines, collaborative curriculum design, facilitator training, and the incorporation of reflective activities along with structured feedback (Lepage-Farrell et al., 2024). Organizational flexibility and alignment with the institutional context are also recognized as crucial to overcoming barriers such as schedule coordination, resistance to change, and professional hierarchies. Finally, the literature emphasizes that participatory methodologies, ongoing supervision, and longitudinal evaluation foster the sustainability and effectiveness of Interprofessional Education, thereby consolidating a culture of collaboration and continuous learning among healthcare teams (Lepage-Farrell et al., 2024).

1.5. Healthcare education in Europe

European healthcare education is grounded in competency-based education and outcome-based education, pedagogical approaches aimed at aligning teaching with the practical demands of healthcare systems.

A study conducted in Belgium shows that the implementation of competency-based education promotes a more transparent approach focused on defined competencies, although it faces challenges related to curriculum adaptation, administrative burden, and assessment (Redmond et al., 2024).

Additionally, personalized learning pathways, where students take an active role under the guidance of facilitators, have been highlighted for enhancing flexibility and better preparing students for the workplace

(Mulder et al., 2007). These models are aligned with the European Qualifications Framework, which promotes comparable learning outcomes and academic mobility across European countries (European Commission, 2018).

This study examines how three fundamental competency dimensions clinical, technological, and soft skills are integrated into contemporary healthcare education. Our analysis, which focuses on European training programs, highlights the crucial need for practical and contextualized training. We investigate how these competencies are articulated and, more importantly, how they contribute to the direct professional development and daily practice of healthcare teams.

In this context, the study aims to analyze how clinical, technological, and soft skills are addressed in the training of healthcare professionals, and how they can be more effectively integrated into their professional development. Based on this objective, two research questions guide the analysis: Do evaluations of training modules differ according to the professional profile of participants? And do evaluations of training modules differ depending on the type of competency addressed (clinical, technological, or soft skills)?

2. Method

2.1. Participants and Procedure

The original dataset comprised 1,705 responses collected through the project surveys. However, some cases were excluded due to missing data in key variables. Specifically, 64 records without information on professional profile ("Profession") and 10 records without information on the training module ("Training") were removed. After these exclusions, the final analytical sample consisted of 1,632 responses, of which 1,247 (76.4%) were completed by women. In addition, 8 responses (0.5%) did not include information regarding gender.

Age was recorded using categorical brackets. Respondents represented a wide range of age groups, with the most frequently reported being 20–30 years (17.9%), 41–50 years (14.9%), and 31–40 years (13.0%). Additional responses were recorded in the 51–60 age group (7.9%) and among those aged 61 or older (3.8%). The data refer to individual questionnaire responses rather than unique participants, meaning

that some individuals may have completed more than one survey. It is therefore possible that a single person may have completed the survey more than once.

The data analyzed were collected within the framework of the European project *eHospital4Future* through online surveys administered via the Qualtrics platform. The surveys were distributed among healthcare professionals using social media, professional networks, collaborating hospitals, and were also shared by the trainers after the training sessions. To facilitate participation, the questionnaires were automatically translated into the national languages of each country. While this strategy allowed for broad geographic reach, it also introduced certain limitations regarding sample homogeneity and the consistency of survey administration conditions.

2.2. Instruments

As part of the evaluation system of the *eHospital4Future* project, a satisfaction questionnaire was administered at the end of each training module. This questionnaire included several items aimed at capturing participants' perceptions regarding the quality, usefulness, and applicability of the training received.

In this study, five items were selected because they aligned with the objective of analyzing how clinical, technological, and soft skills are addressed in healthcare training and how they contribute to professional development. The items analyzed were:

1. The instructional materials (reading list, handouts, etc.) increased my knowledge and skills in the subject covered by this module.
2. The module gave me the confidence to do more advanced work in the subject.
3. The module was helpful in progress towards knowledge in this subject.
4. This module is highly relevant with respect to my needs.
5. I was able to reach the goals for this module.

Each item was rated by participants on a 7-point Likert scale (1 = *Strongly disagree*, 7 = *Strongly agree*), with an additional option of *Not applicable*.

2.3. Data processing

Prior to statistical analyses, the data were pre-processed. First, the normality of the numerical variables was assessed using the Shapiro-Wilk test.

Missing values were identified in several key variables. The items with the highest proportions of missing data were: 'The module was helpful in progress towards knowledge in this subject' (45.2%), the age group variable (42.4%), and 'The instructional materials (reading list, handouts, etc.) increased my knowledge and skills in the subject covered by this module' (39.5%).

Other items showed lower proportions of missing data, such as 'The module gave me the confidence to do more advanced work in the subject' (9.6%), 'This module is highly relevant with respect to my needs' (8.8%), and 'I was able to reach the goals for this module' (11.1%). For the gender variable, only 0.5% of missing data were recorded.

A significant challenge in the dataset was the high proportion of missing data, particularly for variables such as 'The module was helpful in progress towards knowledge in this subject' (45.2%) and the age group variable (42.4%). Given that several key variables exceeded the 20% threshold, we opted not to use multiple imputation techniques, in line with the methodological recommendations of Jakobsen et al. (2017). This approach of using only complete cases was chosen to preserve the integrity of the original data and to avoid introducing artificial bias that could compromise the validity of the results. While this strategy reduces the analytical sample size and may limit the generalizability of our findings, it was deemed the most cautious and transparent approach for this exploratory study.

Each evaluated course was categorized exclusively into one of three thematic areas, according to the type of competencies addressed: hard skills, soft skills, or digital skills. Hard skills courses focused on the development of specific clinical competencies, such as the use of complex medical technologies or the application of advanced technical procedures. Soft skills courses focused on personal and interpersonal abilities, such as emotional intelligence or stress management, which are essential for professional well-being. Finally, digital skills courses aimed to strengthen the technological capabilities of healthcare personnel, particularly in the use of artificial intelligence, clinical data, and digital tools for medical care. This thematic variable was included in the analyses to explore whether perceptions of the training varied according to the competency focus of the module.

2.4. Analysis Plan

Before conducting the main analyses, we examined the statistical properties of the selected variables, including the presence of outliers and the distribution of the data. The results indicated that the variables did not follow a normal distribution and several contained outliers. Therefore, non-parametric tests were used. Specifically, the Kruskal–Wallis test was applied to identify overall differences across professional groups, followed by Dunn's post hoc tests with Bonferroni correction for pairwise comparisons (Kruskal & Wallis, 1952; Dunn, 1964; Yang & Lee, 2025).

Moreover, since some of the key variables showed a high percentage of missing data exceeding 20% in several cases, we decided not to apply any imputation techniques, in line with current methodological recommendations (Jakobsen et al., 2017). Instead, the analyses were conducted using only the available complete cases for each set of variables. This approach was chosen to preserve the validity of the findings and reduce the risk of bias associated with imputation in contexts with substantial data loss.

Finally, it is important to note that analyses were performed on individual questionnaire responses rather than unique participants. Since no personal identifiers were collected and individuals may have participated in more than one training module, duplicate entries in the dataset could not be ruled out. This limitation should be considered when interpreting the results.

3. Results

3.1. Sample Characterization

For this analysis, 1,632 questionnaire responses were analyzed, grouped into four professional categories according to the role indicated within the healthcare system.

The groups were defined as follows:

- **Group 1 – Nursing:** Included nursing professionals and assistants (e.g., Nurse, Assistant Nurse); this group provided the largest number of responses (n = 661).

- **Group 2 – Doctors:** Included doctors from different specialties, including primary and general care (e.g., Specialist Doctor, Primary Care Doctor, General Practitioner); this group contributed 364 responses.
- **Group 3 – Administrative or Non-clinical Staff:** Included non-caregiving roles (e.g., Administrative/ Non-clinical Staff); this group contributed 514 responses.
- **Group 4 – Other Professional Profiles:** Included responses that did not fit into the previous groups, such as less represented professions or other sectors; this group contributed 93 responses.

This classification allows us to observe differences in perception according to the degree of clinical involvement and the type of training received by each professional group.

Likewise, the courses evaluated were classified into three thematic categories according to the type of skills addressed: hard skills, soft skills, and digital skills. This classification allowed us to examine whether the participants' perceptions varied depending on the skills focus of each module. In total, 647 responses corresponded to hard skills courses, 584 to soft skills courses, and 401 to digital skills courses.

This initial characterisation allows us to contextualise the subsequent analyses, which explore how the perception of the training modules varies according to professional profile and the type of skills addressed.

3.2. Differences in the perception of training materials

To analyze variations in the perception of training materials, responses to the selected questionnaire items were examined across two key dimensions: professional group and course competency category (hard skills, soft skills, or digital skills). The results are presented in graphical form to illustrate differences in mean ratings by group and competency type.

Figure 1 shows the mean score for the item 'The instructional materials (reading list, handouts, etc.) increased my knowledge and skills in the subject covered by this module', segmented by professional group and competency category (hard skills, soft skills, digital skills).

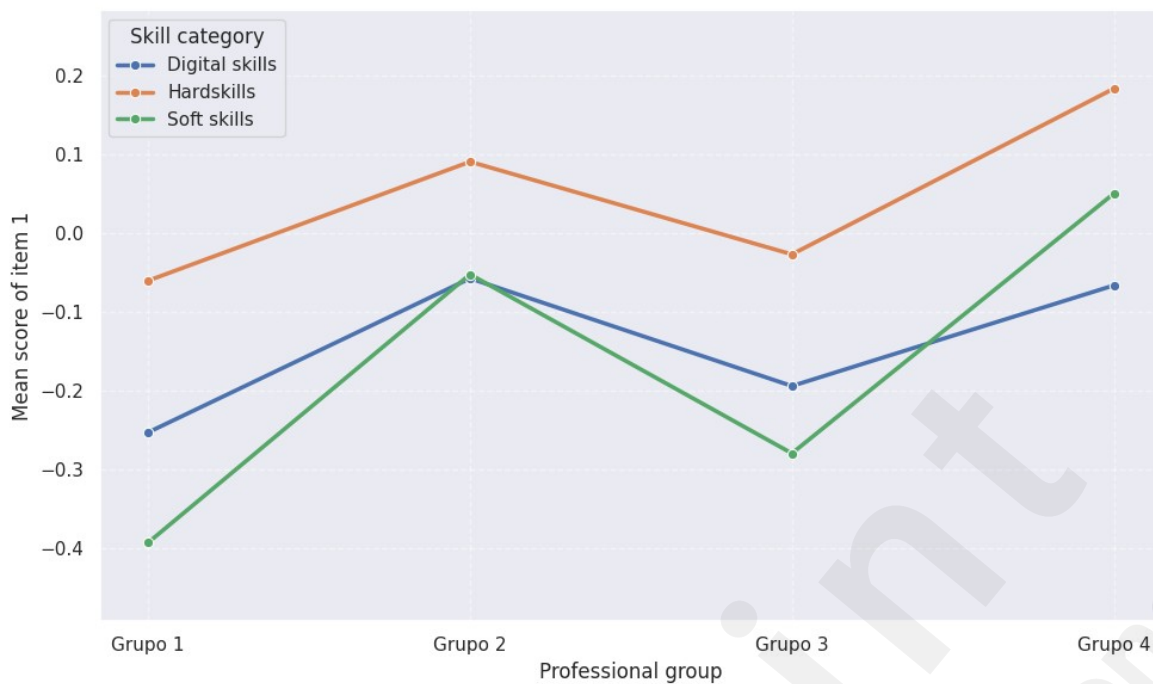


Figure 1.

Mean perception of module materials (Item 1), by professional group and competency type

The results show that the assessment of the training materials varies depending on the type of competence addressed (digital, hard, or soft skills) and the professional group.

In the case of soft skills, the Kruskal-Wallis analysis revealed significant differences between the professional groups ($H = 24.26$, $p < .001$). The post hoc analysis with Bonferroni correction showed that group 2 (Doctors) rated the materials significantly higher than group 1 (Nursing) ($p = .0002$) and group 4 (Other professional profiles) ($p = .0018$). No significant differences were observed between the other pairs of groups ($p > .05$).

For hard skills, significant differences were also found between groups ($H = 10.43$, $p = .0153$). The post hoc analysis indicated a single statistically significant difference: group 2 (Doctors) scored higher than group 1 (Nursing; $p = .0401$). No significant differences were detected between the other groups.

In terms of digital skills, no statistically significant differences were found between the professional groups ($H = 7.35$, $p = .062$), which suggests a similar, although generally lower, assessment of this type of training among the different profiles.

Figure 2 shows the mean scores of item 2 ('The module gave me the confidence to do more advanced work in the subject'), grouped by type of competence (digital, clinical, and soft) and professional

group. The analyses reveal statistically significant differences in the three categories of competencies.

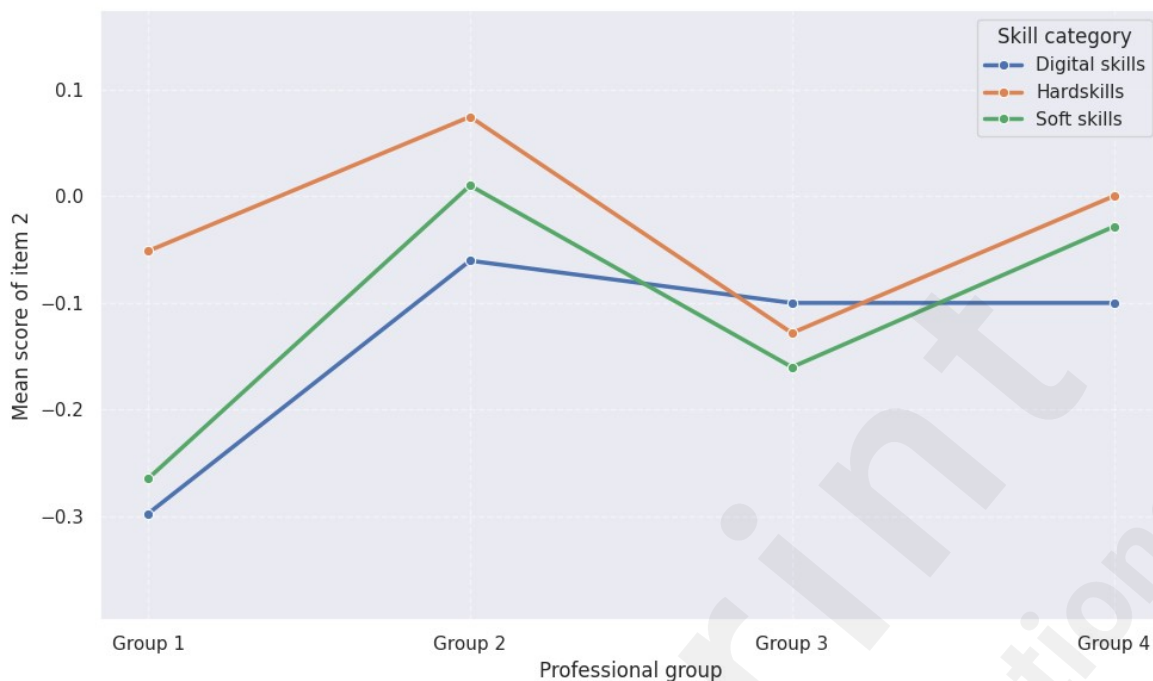


Figure 2. Mean perception of confidence (Item 2), by professional group and competency type

For soft skills, the Kruskal-Wallis test indicated significant differences between groups ($H = 19.79$, $p < .001$). Bonferroni corrected post hoc analysis showed that group 2 (Doctors) reported significantly higher confidence levels than group 1 (Nursing) ($p = .0001$). No significant differences were observed between the other pairs of groups.

In the case of hard skills, significant differences were also found ($H = 11.81$, $p = .0081$). Group 2 (Doctors) scored higher than group 1 (Nursing; $p = .0131$) and group 3 (Administrative or non-clinical staff; $p = .0184$), indicating a greater perception of self-efficacy in this type of content by the medical community.

Regarding digital skills, significant differences were also observed between groups ($H = 14.49$, $p = .0023$). Group 2 (Doctors) reported higher confidence than group 1 (Nursing; $p = .0052$) and group 3 (Administrative or non-clinical staff; $p = .0354$), this was the only group that reported positive mean scores in this category.

This pattern mirrors the earlier findings: doctors (Group 2) once again evaluated the training more positively, particularly in terms of confidence to tackle advanced tasks, across all competency types.

Figure 3 shows the average scores of the item 'The module was helpful in progress towards knowledge in this subject' differentiated by type of competence addressed and professional group. The analysis revealed statistically significant differences in two of the three categories of competencies.

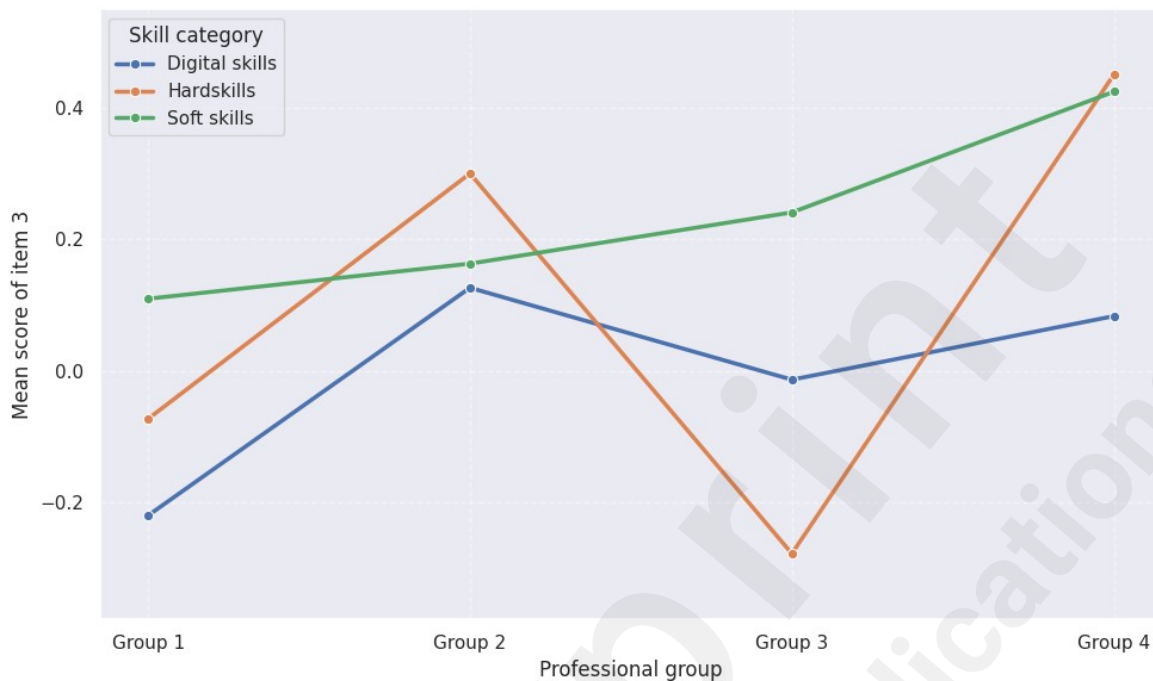


Figure 3.

Perception of knowledge progress (Item 3), by professional group and competency type

For hard skills, significant differences were found between professional groups ($H = 14.88$, $p = .0019$). The post hoc analysis identified a statistically significant difference between group 2 (Doctors) and group 3 (administrative or non-clinical staff; $p = .0023$), with the perception of group 2 being more positive regarding the progress made in this dimension of knowledge.

In the case of digital skills, significant differences were also detected between groups ($H = 9.17$, $p = .0271$). The post hoc analysis showed a significant difference between group 2 (Doctors) and group 1 (Nursing) ($p = .0270$).

For soft skills, no statistically significant differences were found ($H = 5.70$, $p = .1271$), which suggests a more homogeneous perception among professional groups regarding the advancement of knowledge in this type of skills.

Overall, these results indicate that perceptions of the module's impact on the advancement of knowledge differ especially in technical and digital skills, and that group 2 (Doctors) tends to report higher

ratings than other groups, particularly compared with non-clinical and nursing staff.

Figure 4 shows the mean scores for the item 'This module is highly relevant to my needs,' by competency type and professional group. The analyses revealed statistically significant differences in the three categories of competencies.

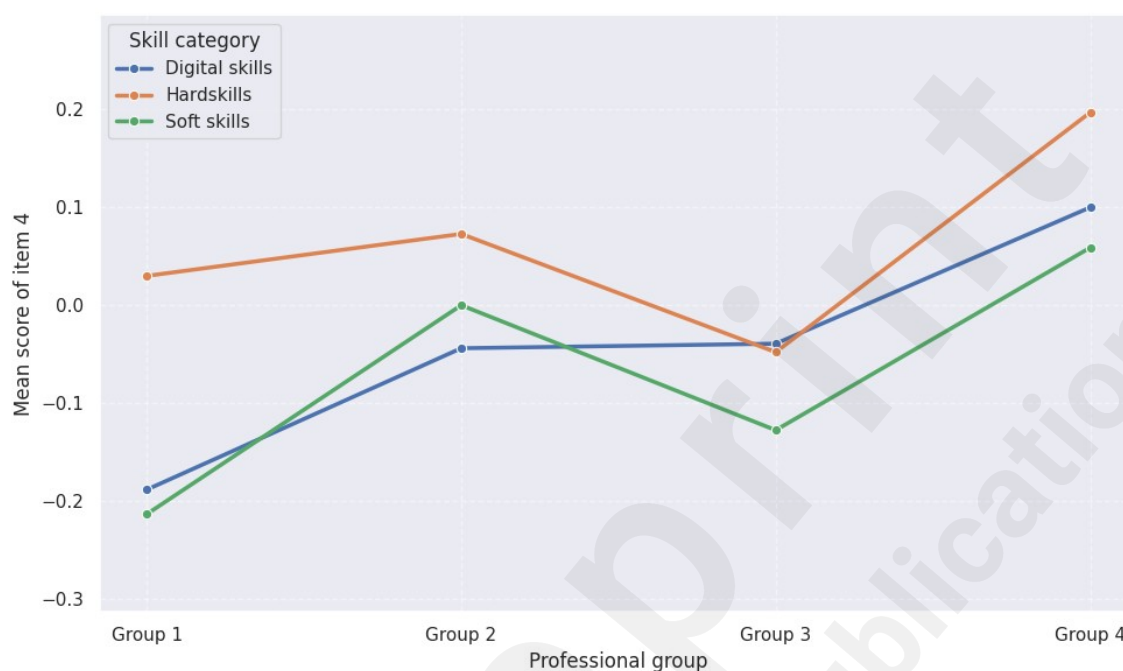


Figure 4. Perception of module relevance (Item 4), by professional group and competency type.

For soft skills, significant differences were observed between professional groups ($H = 15.31$, $p = .0016$). The post hoc analysis indicated that group 2 (Doctors) valued the relevance of the module significantly more than group 1 (Nursing) ($p = .0048$). No significant differences were found in the other pairwise comparisons.

In the case of digital skills, significant global differences were also identified ($H = 12.44$, $p = .006$). The post hoc analysis showed a statistically significant difference between group 1 (Nursing) and group 3 (Administrative or non-clinical staff; $p = .0496$), although the mean scores of both groups were close to zero.

For hard skills, although the Kruskal-Wallis test yielded a significant result ($H = 8.97$, $p = .0298$), the post hoc analysis did not reveal specific comparisons that reached statistical significance after Bonferroni adjustment, suggesting that the differences were not sufficiently consistent between pairs of groups.

Overall, these results indicate that the perception of relevance of the module in relation to one's own needs varies according to the type of competence addressed and the professional profile. Group 2 (Doctors) maintains a tendency to value content more positively, especially in soft and digital skills, compared to groups

such as nursing or administrative staff.

Figure 5 presents the mean scores for the item 'I was able to reach the goals of this module,' segmented as in the previous figures. The results show statistically significant differences in the three categories analyzed.

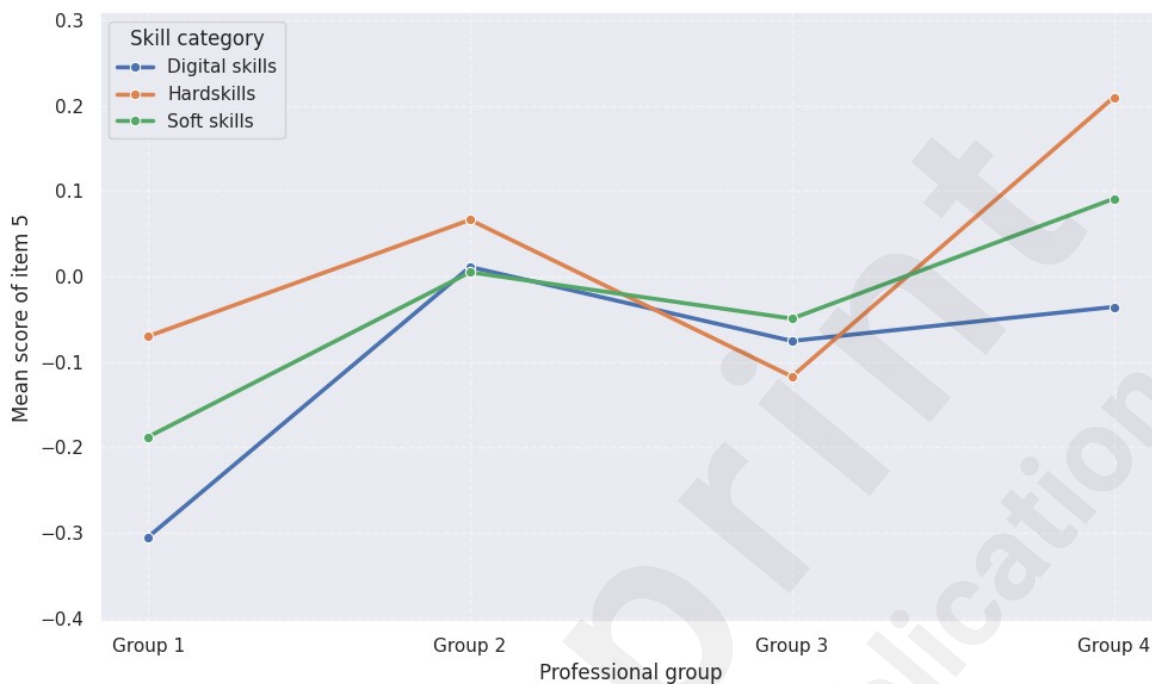


Figure 5. Perception of goal achievement (Item 5), by professional group and competency type

For soft skills, the Kruskal-Wallis test showed significant differences between groups ($H = 17.52$, $p = .0006$). The post hoc analysis with Bonferroni correction revealed that group 2 (Doctors) scored significantly higher than group 1 (Nursing; $p = .0063$) and than group 3 (Administrative or non-clinical staff) ($p = .0064$). No significant differences were found with group 4 (Other professional profiles).

In relation to hard skills, significant differences were also observed ($H = 19.54$, $p = .0002$). Group 2 (Doctors) had significantly higher scores than group 1 (Nursing; $p = .0185$) and group 3 (Administrative or non-clinical staff; $p = .0084$). Likewise, group 4 (Other professional profiles) differed significantly from group 1 ($p = .0160$) and group 3 ($p = .0097$), which indicates a greater perception of achievement of objectives in both cases.

In terms of digital skills, the most marked difference between groups was recorded ($H = 26.71$, $p < .001$). Group 2 (Doctors) scored significantly higher than Group 1 (Nursing; $p = .00004$) and Group 3 (Administrative or non-clinical staff; $p = .0009$). Group 4 (Other professional profiles) did not present statistically significant differences with the rest of the groups.

These results reinforce the trend observed throughout the analyses: group 2 (Doctors) consistently

rated the training more positively, particularly regarding the achievement of module objectives, compared with Groups 1 (Nursing) and 3 (Administrative or non-clinical staff).

4. Discussion

This study aimed to analyze how clinical, technological, and soft skills are addressed in the training of healthcare professionals, and how they can contribute to professional development. Consistent with our hypotheses, the results confirmed that (a) the evaluation of training modules varies across professional groups, with doctors reporting more positive perceptions than nurses, administrative staff, or other professionals, and (b) the type of competency addressed also shapes participants' evaluations, with clinical and soft skills training rated more positively than digital skills.

Overall, the findings indicate that professional background and competency type strongly influence how training is perceived. Doctors tend to evaluate multiple aspects of training more positively, such as the materials, the confidence gained, the advancement of knowledge, and the achievement of objectives, especially regarding clinical competencies and soft skills.

One potential explanation for the consistently more positive ratings from doctors (Group 2) is that the training content, particularly for clinical and soft skills, may be more closely aligned with their professional roles and prior experiences. This is consistent with previous research suggesting that training is most effective when it is directly applicable to a professional's daily practice and career path. For example, a module on advanced technical procedures (hard skills) or leadership (soft skills) may be perceived as more relevant and useful by a doctor compared to an administrative professional. While our non-experimental design prevents us from establishing a causal relationship, these findings suggest that the perceived relevance and effectiveness of training are highly dependent on the professional's specific context and role. This highlights the importance of tailoring educational programs to the distinct needs of each professional group, as also noted by Moropa et al. (2025) and the European Commission (2020).

In the case of digital skills, the ratings were lower and more consistent across the different professional groups. However, some significant differences were noted, suggesting that the training design in this area may be less well adapted to professional needs. These results point to the need to develop proposals that are more tailored to the professional profile, both in terms of content and pedagogical

approaches. This finding is consistent with previous studies showing that many healthcare professionals recognise the potential value of digital tools but express difficulties in using them or lack confidence in their practical application (Jarva et al., 2022).

Furthermore, numerous studies have emphasised that the most effective training programmes do not focus exclusively on technical skills but also integrate relational components. This mixed approach reinforces both clinical development and communication and collaboration skills (Rasenberg et al., 2023). In line with this, Moropa et al. (2025) found that nursing trainers who incorporate soft skills into their classes observe improvements in patient interaction, teamwork, and professional empowerment.

Previous studies have highlighted that continuing education systems in the health sector must address both the technical demands of the job and the diverse career paths and organizational contexts in which professionals work (Cedefop, 2023). It has also been mentioned that the effectiveness of training programmes depends mostly on their ability to adapt to local contexts and to promote the active participation of healthcare personnel in the design of training content (World Health Organization, 2022).

In general terms, the results highlight the need to further adapt healthcare training programmes to the specific profiles of the target audience. While these programmes were already designed for professional groups, our findings suggest that stronger alignment with the distinctive needs and roles of each profile could enhance their perceived relevance and effectiveness. Further evidence is needed to confirm this hypothesis, since career paths and levels of prior exposure to training content vary between healthcare profiles (European Commission, 2020).

Overall, the study underscores that while clinical and interpersonal contents appear more directly aligned with participants' daily practice, digital competencies, though recognized as relevant, require stronger contextualization to professional needs. The findings highlight the need for adaptive training programs that balance technical, relational, and digital components while incorporating hands-on activities directly applicable to the workplace. Future research should further explore how to align training strategies with diverse professional profiles while enhancing the perceived relevance and direct applicability of digital competencies.

From a methodological point of view, the study has several limitations that should be considered when interpreting the data. There were no unique identifiers, which makes it impossible to ensure that each record corresponds to a different person. The high number of missing values and questionnaire fatigue also limit the

quality of the records. These conditions make it necessary to question not only the results but also the data collection process itself. In the future, it would be advisable to have shorter questionnaires tailored to each professional profile, as well as mechanisms to record the context in which the training is carried out. Future studies should also consider the possibility of identifying participants, at least anonymously, to avoid duplication and facilitate longitudinal analysis

Although exploratory and constrained by methodological limitations including missing data, lack of participant identifiers, and heterogeneous contexts this study provides valuable insights for improving the quality and relevance of healthcare education. It raises important questions for the design of more effective, equitable, and contextualised training programmes. While not a scientific breakthrough in the strict sense, it makes a useful contribution to rethinking training processes with greater emphasis on participants' experiences.

The results invite reflection on the need to develop more adaptive training models that recognise the differences between professional groups and seek to improve not only the content, but also the way in which training data is collected, analysed, and interpreted. This reflection on the process is as necessary as the analysis of the results itself.

Conclusions

This exploratory study provides an initial overview of how clinical, digital, and soft skills are addressed in training programmes aimed at healthcare professionals, and how these competencies are valued in relation to professional development.

The findings respond directly to the two research questions guiding the study. First, evaluations of training modules do differ according to the professional profile of participants: doctors consistently rated the usefulness of materials, the confidence gained, and the achievement of objectives more positively than nurses, administrative staff, or other professionals. Second, evaluations also differ depending on the type of competency addressed: modules focused on clinical and soft skills were rated more positively, whereas digital skills received lower and more homogeneous evaluations across professional groups.

The study shows that training content must be tailored to the characteristics, roles, and expectations of each professional group. Moreover, the findings highlight the importance of considering not only the technical content delivered but also the subjective experiences of participants as indicators of training quality and effectiveness.

Several methodological limitations should be acknowledged, including missing data, the lack of participant identifiers, and the heterogeneous contexts of questionnaire administration. These factors call for caution when interpreting the findings.

For future research, we recommend designing shorter and more specific assessment tools tailored to each professional profile, implementing anonymous identification mechanisms to improve data quality, and systematically recording contextual variables such as country, modality, and level of training. It would also be valuable to explore mixed methodologies, combining quantitative analyses with interviews or open-ended questionnaires, to capture participants' motivations, barriers, and expectations more comprehensively. Finally, future studies should evaluate not only immediate subjective perceptions but also the long-term impact of training on professional performance.

This study does not aim to provide conclusive answers but to open a space for reflection on how to enhance the quality and practical relevance of training programmes for healthcare professionals. By adopting a more contextualized and practice-oriented approach, such as offering training in smaller groups, integrating case studies, and incorporating hands-on activities, educational institutions can foster stronger engagement, ownership, and applicability of training outcomes. This pedagogical shift is essential for ensuring that training translates into tangible competencies and contributes to better professional and patient outcomes.

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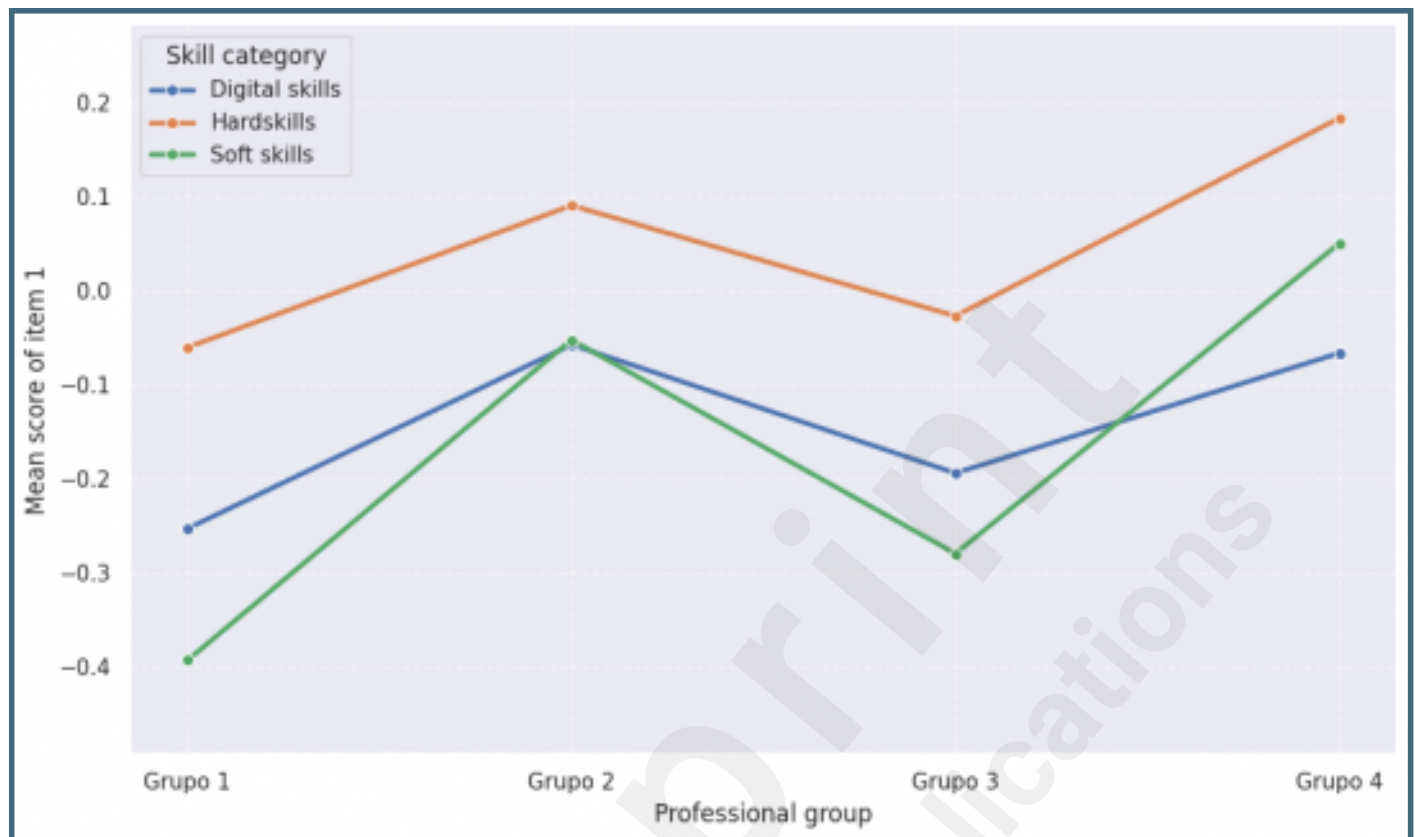
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Supplementary Files

Figures

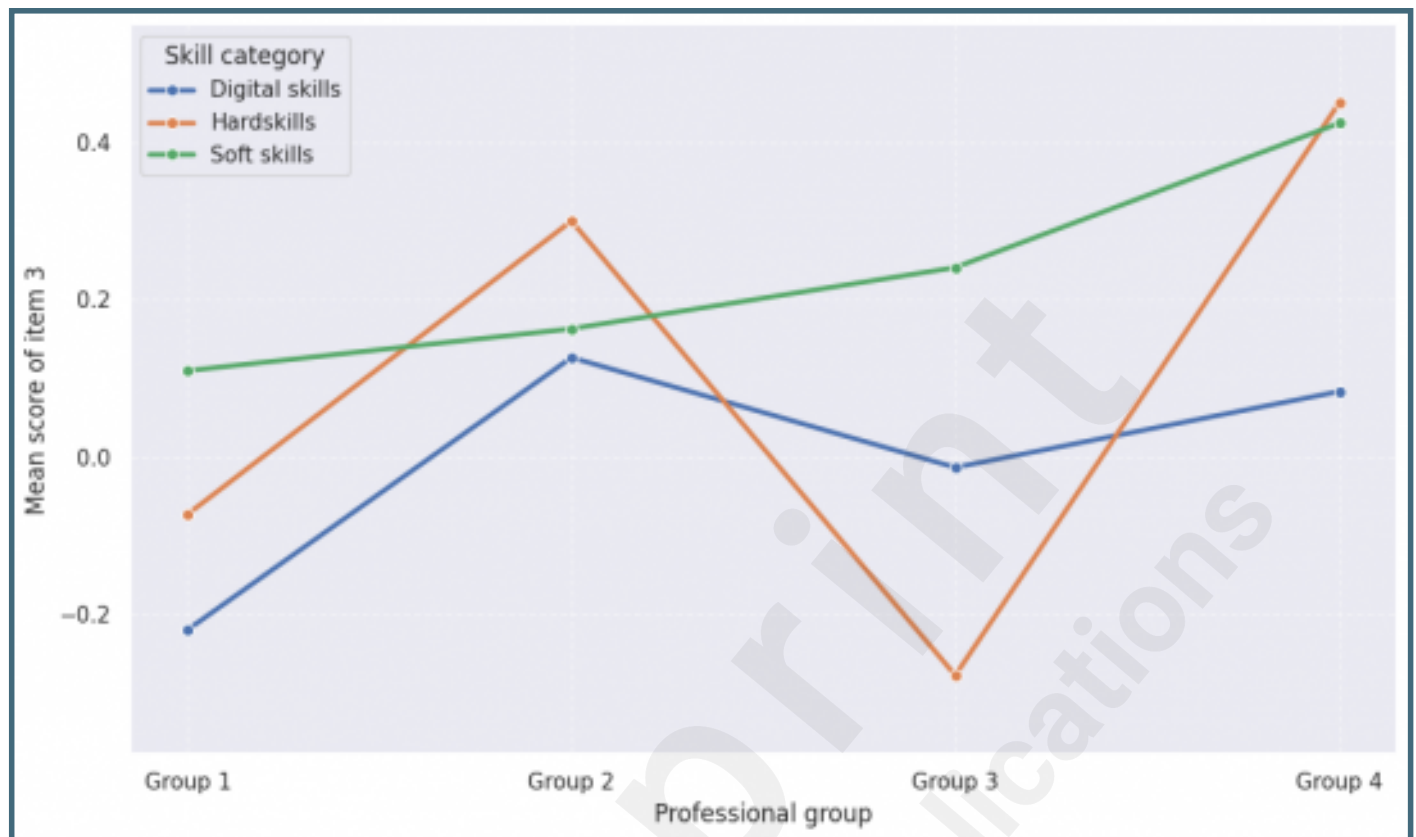
Mean perception of module materials (Item 1), by professional group and competency type.



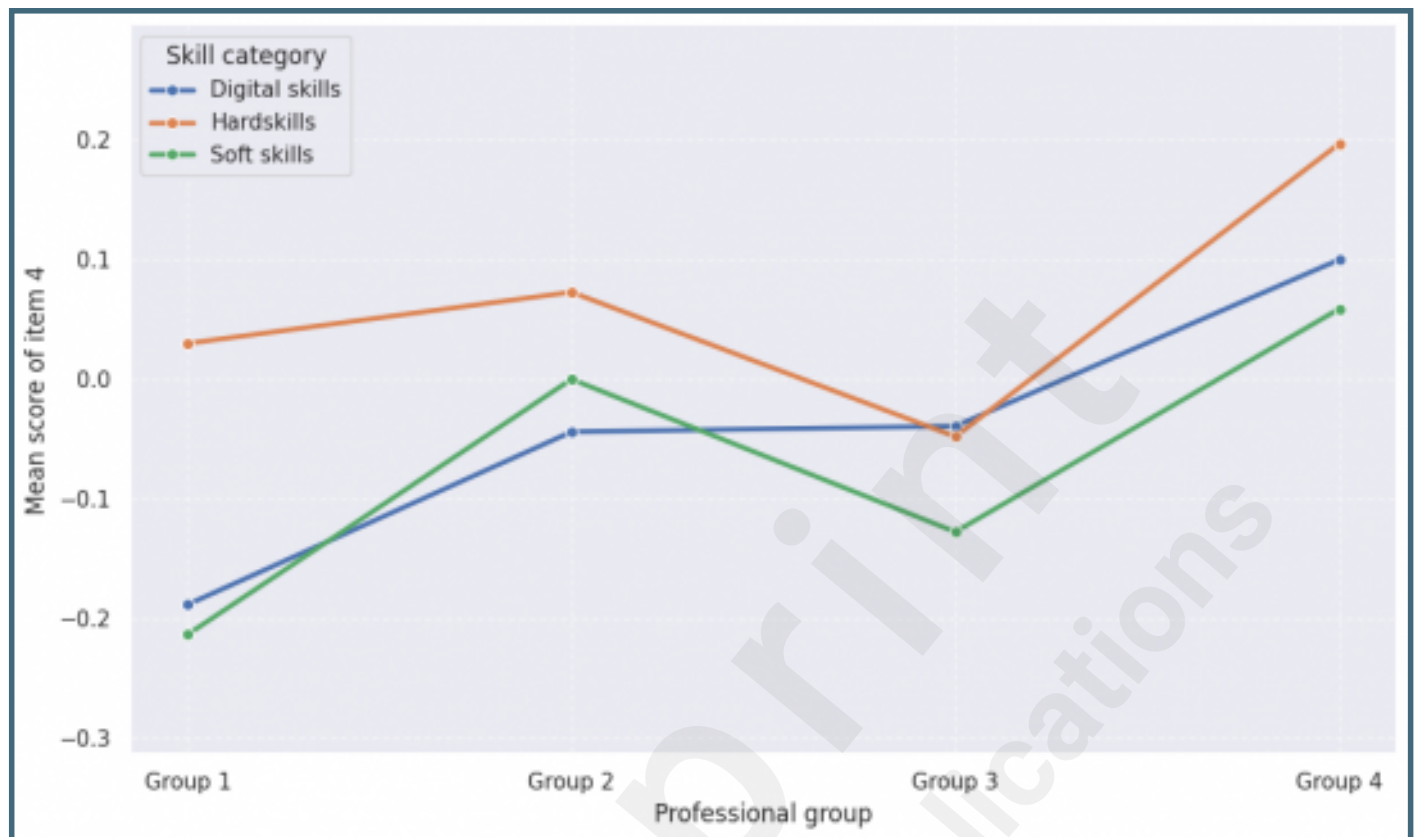
Mean perception of confidence (Item 2), by professional group and competency type.



Perception of knowledge progress (Item 3), by professional group and competency type.



Perception of module relevance (Item 4), by professional group and competency type.



Perception of goal achievement (Item 5), by professional group and competency type.

