Innovating Residency Orientation Training. A Multi-Modal, Gamified Approach to Clinical Onboarding at Fondazione Policlinico Universitario Campus Bio-Medico

Claudio Pensieri[*], Sabrina Saccoccia[^], Rosanna Alloni[°]

Abstract
This study assesses the effectiveness of "Resident Day," a multi-modal orientation program at Fondazione Policlinico Universitario Campus Bio-Medico for newly enrolled medical residents. The program combines traditional lectures, experiential simulations, and gamified activities, including a hospital-based treasure hunt designed to bridge theoretical knowledge and practical clinical readiness. A comparative analysis of pre- and post-training surveys from the 2022 (n. 146 respondents) and 2024 (n. 135 respondents) cohorts revealed statistically significant improvements in technical competencies, spatial orientation, and familiarity with clinical workflows. Notably, the gamification element, particularly the "Treasure Hunt," significantly enhanced spatial orientation and clinical area familiarity, with 2024 participants showing greater improvement compared to 2022. While practical sessions received strong evaluations, the team-building activity ("Airplane Challenge") scored lower than in previous years, suggesting areas for refinement. Overall, the Resident Day initiative demonstrates that innovative, engaging onboarding strategies can effectively enhance early clinical integration, technical skills, and resident confidence. Experiential

[*] Department of Human Sciences, LUMSA, Rome, Italy: E-mail: c.pensieri1@lumsa.it. The Corresponding Author is the chief contributor for the paragraphs: Background, Setting, Methods, Results, Discussion. ORCID: https://orcid.org/0000-0001-8502-2345. r.alloni@unicampus.it, is responsible for the conception and design of the article and she is chief contributor for the conclusion paragraph. ORCID: https://orcid.org/0000-0001-8877-2141.
[^] Clinical Leadership team – Fondazione Policlinico Unviersitario Campus Bio-Medico, Rome, Italy. E-mail: s.saccoccia@policlinicocampus.it, writes par. Background. ORCID: https://orcid.org/0009-0009-0530-6117.
[°] Clinical Director FPUCBM and Università Campus Bio-Medico: Specialization School Coordination, Rome, Italy.

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learning and gamification emerged as particularly impactful, underlining the value of active, hands-on methodologies in bridging the gap between academic training and real-world medical practice. These findings may inform broader reforms in medical education and orientation programs internationally.
Key Words: Resident Orientation, Medical Education, Gamification, Clinical Training, Experiential Learning

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Introduction

Each November, a new cohort of medical residents begins training across Italy's teaching hospitals. For many, this transition marks the shift from theoretical knowledge to applied clinical practice – an emotionally and cognitively intense phase that shapes professional identity and competence. While orientation is a well-established practice in North American and other systems (McGrath, 2017), structured onboarding in the Italian context has been less systematically described.

This can be summarized as follows:

- High turnover from outside institutions.
- Unfamiliarity with hospital systems and culture.
- Need for cross-training across disciplines.

For some residency programs, this new beginning includes the annual tradition of orientation (Lappen, 2014), a week full of hours of information on what it means to be a resident. For most physicians, the transition from medical school to residency program is a pivotal moment in their careers, a time when the theoretical knowledge learned through countless hours of study starts to collide with the practicalities of patient care.

The transition period is one of intense growth and self-discovery as they develop the professional identity, clinical competence, and ethical principles of future physicians while they learn how to fill the electronic medical records, order entry, teamwork, policies and procedures, etc.

The hurdles for new medical residents range from adapting to the frenetic tempo of clinical practice to facing off against complicated patients for the first time, under the stress of time, can be overwhelming, and at times demoralizing.

Without appropriate direction and support, this transition may lead to disorientation, low self-esteem, and increase in burnout. All of these are not positive outcomes and supporting patients as well as the resident will be affected. That is why there is no need for desires, such programs are crucial to properly guide and orient them and medical residents no longer consider

structured orientation programs an extravagance. They act as a bedrock, allowing trainees to gain the requisite skills as well as the right attitude and knowhow to perform their new roles.

A thoughtfully prepared orientation program cultivates learning, adaptability, resilience and teamwork as well as puts into practice the institutional policies and clinical workflows. At the same time, it incorporates communication, ethics, and work-life balance which are essential to long-term success in the medical profession.

If we consider the US Emergency medicine (EM) residency training, the first formal orientation program for incoming EM residents was started in 1976. One attempt to describe the nature of orientation programs was by Brillman (1995). Now almost all residencies offer orientation to incoming residents, but little is known about the curricular content or structure of these programs.

McGrath (2017) found that more programs (99%) offer formal orientation and allocating more time to them. Lectures remain the most common educational activity. They found increases in the use of skills labs and specialty certifications. But they also observed increases in time dedicated to clinical work during orientation. Only a few programs reported engaging in baseline or milestone assessments, an activity that could offer significant benefits to the residency program (McGrath, 2017).

In this article, we investigate the unique attributes and benefits of an orientation program for Italian residents undergoing specialty training.

Medical institutions can enhance the orientation experience for their residents and concurrently increase the skill set, confidence, and compassion within the healthcare workforce by applying comprehensive and evidence-based orientation initiatives.

As the population grows older, the demand for multidisciplinary teams to manage complex care has undoubtedly increased. As these teams become more integrated, the knowledge, skills, and attitudes of resident physicians to practice safe and effective care evolve (Mank, 2022).

Fondazione Policlinico Universitario Campus Bio-Medico (PUCBM) is a teaching hospital having about 374 beds and roughly 37 medical/surgical departments, which includes an emergency unit and a Hospice.

From 2017, the PUCBM has this orientation course for new residents.

In 2024, 25 Residency program (22 medical and 3 non-medical: Clinical Pathology and Clinical Biochemistry; Microbiology and Virology; Clinical Pharmacology and Toxicology) featuring roughly 135 new medical residents and 10 non-medical residents started in the Fondazione Policlinico Universitario Campus Bio-Medico, only 15% of them had their medical education in our university.

In Italy, postgraduate medical training consists of 4 or 5 years of residency (depending on the specialty) after a national examination. Admission to the residency program is based on examination results and overall score, and there is an annual limit to the number of residency positions. During training, residents work in academic hospitals, gain clinical experience in their chosen specialty, and rotate between major subspecialties.

They also follow an educational program based primarily on lectures (i.e., teaching activities in front of the class) and may be involved in research projects.

The level of autonomy with which residents can perform duties is regulated by law and depends on the year of residency (Abati, 2022).

This means also that new first-year residents (85% of them went from other University):

1. Don't know the layout of the hospital where they'll work (where to find departments clinical services like endoscopy, radiology, etc.).
2. Don't understand the hospital's current "policies and procedures" (guidelines, procedures, operating instructions, policies, etc.) (Pensieri, 2021).
3. Can't find some key services in the hospital (hospital management, admissions office, pharmacy administrative offices) and important people (heads of operating units, nursing coordinators, who manages beds or other resources, etc.).
4. They are not familiar with the hospital's clinical records system (information technology).
5. They are not aware of the institution's rules (dress code, ethics code, nursing organization, etc.).

The mission of the Campus Bio-Medico University of Rome is that "students, including residents, should reach high-level professional and scientific understanding and competence along with high moral sense" (UCBM Aims Charter, 2020).

In a context that technical preparation and learning have a substantive impact on the required skills, clinical practice has undergone a deep transformation (Guaglianone, 2007). In recent years, many Italian medical students have expressed a desire for university professors to improve their teaching skills and adopt more engaging methods. This trend has been highlighted in studies and projects such as the COLT Project (Jacobs, 2012; Ramboldi 2021), which analysed student perceptions of teaching in Italian medical schools.

In undergraduate medical and health faculties, lectures are a notable but not exclusive part of the forms of learning (Pensieri, 2019).

"The role of teachers is rightly believed to be universally crucial to the quality of education. Teachers, in addition to decisively affecting the educational outcomes of students, activate and support the improvement processes of the institutions they work in" (Tammaro, 2017).

Teaching at the university level requires skills that include (in addition to knowledge of the discipline) mastery of teaching strategies (Biasutti, 2017).

In addition, the use of effective teaching methodologies, capable of getting each student to acquire knowledge and skills more quickly, consistent with the identified objectives, effectively saves time-work time that can be invested in other areas of greater interest to the student (Binetti, 2000).

The Fondazione Policlinico Universitario Campus Bio-Medico nursing care, unlike in many Italian hospitals, is organized according to the model for small teams and by complexity of care, a model integrated with the criterion of bed distribution by "intensity of care". This means that patients are grouped by type of care required and not by operative unit (Pensieri, 2022).

So, we can have a urology patient near an orthopaedic one, every Department can also have patients hospitalized in different Hospital's floors.

It is therefore a very flexible organization that has abandoned the traditional departmental structure to maximize efficiency with maximum support.

Since 2014, the Fondazione Policlinico Universitario Campus Bio-Medico has been a Joint Commission International (JCI) accredited hospital (as an "Academic Medical Center" a hospital where teaching and clinical research activities take place in addition to clinical activities).

Joint Commission International accreditation means that the entire hospital (from governance to staff) is focused on quality and safety of care.

It is obvious that in this context the entry into clinical practice of a group of residents is crucial.

We started our Resident's pedagogical project with "practical action", of "discovery" and "learning in the field" through:

- Active learning design.
- Immersive clinical simulation.
- Gamification in professional education.

The Fondazione Policlinico Universitario Campus Bio-Medico has greatly backed the application of practice and synergetic learning because it assists to know how to "fully learn new skills and knowledge" (Haynes, 2007).

In fact, we experienced at the same time the teach/educate/train (Cambi, 2000) described as the "restless trinomial".

Numerous components contribute to a resident's good training. Training needs direction to follow and tools where to direct themselves, techniques to navigate, values that know how to inflate the sails and drive towards existential design goals (Iori, 2018).

This, therefore, cannot rest on a single aspect of being, a single moment in life, or on just one dimension. For us it is no longer sufficient to construct the resident's boat, we want to provide him or her with all the features that will allow for safe navigation through the stormy sea, starting from the very first orientation.

Methods

Two anonymous quantitative evaluation questionnaires were used to evaluate the impact of the Resident Day orientation program to first-year residents at Fondazione Policlinico Universitario Campus Bio-Medico (PUCBM). We administered in November 2024:

1. An entry questionnaire to assess previous training and knowledge (134 questionnaires out of 140 Residents enrolled). In the same survey we collected data to assess possible future training needs, in three areas: technical skills, quality and safety procedures, and working environment knowledge.
2. A questionnaire at the end of the training to assess the change in this knowledge and to assess the perceived quality of the training.

The **pre-training questionnaire** (38 items) captured:

- Demographic data (5 items).
- Prior training (e.g., BLSD, radiation protection) (5 items).
- Awareness of hospital layout and services (1 item).
- Interest in further training and extracurricular activities (2 items).
- Familiarity with institutional quality, safety procedures, and IT systems (25 items).

The **post-training questionnaire** (33 items) assessed:

- Demographic data (2 items).
- Expectations and reflections on training (1 item).
- Change in spatial familiarity with the hospital (1 item).
- Perceived understanding of institutional protocols and systems (6 items).
- Perceived value of individual sessions (23 items), rated on a five-point Likert scale (1 = Not at all useful, 5 = Very useful).

The Resident's Day orientation program

We conducted the training on the first useful day after the start of the contract, on 4, 5 and 6 November 2024, we scheduled 19 hours of training (+16 of Safety at work) as follows:

1) In-person lectures: 12 hours.
2) Practical activities 7 hours: role-play and innovative teaching activities (treasure hunter, simulated liver biopsy, paper airplanes, bioethics' clinical cases, etc.).
3) 9 online courses:
   a. N. 4 Mandatory for everyone (BLSD, International Patient Safety Goals JCI (IPSG), Management of Clinical Alarms, Advance treatment directives).
   b. N. 5 different for every residency program: drug preparation, Management of patients under mild and moderate sedation, Management of blood gas analysis; Management of ROTEM (viscoelastometry), Management of glucometers.
4) Moreover, our residents must do the 16 hours training about "safety at work".

Even the choice of "places" where training must take place was not random but determined by teaching requirements.

We used the university's Great Hall, a lawn in front of the university, normal teaching rooms and our Simulation Center, to engage audiences and inject a bit of fun into mundane activities as well as to generate motivational and cognitive benefits.

In terms of the development of more engaging learning environments for students, Ulmanen (2014) suggests that more attention should be paid to create positive opportunities to participate, in terms of both academic activities and peer interaction.

Starting from this suggestion we thought to "balance" frontal lessons and practical activities.

Resident Day's Program:

DAY 1

- Breakfast, registration and delivery of the "Welcome KIT".
- Institutional greetings (Resident representative, Director of Residents programs, University CEO and Dean).
- Campus Bio-Medico University of Rome: "Values and code of ethics".
- The resident's employment contract (legal information).
- Presentation of the Hospital (CEO-General-Director).
- Information on mandatory courses.
- Resident program service.
- Spiritual care of patients; chaplaincy and other religious ministers.

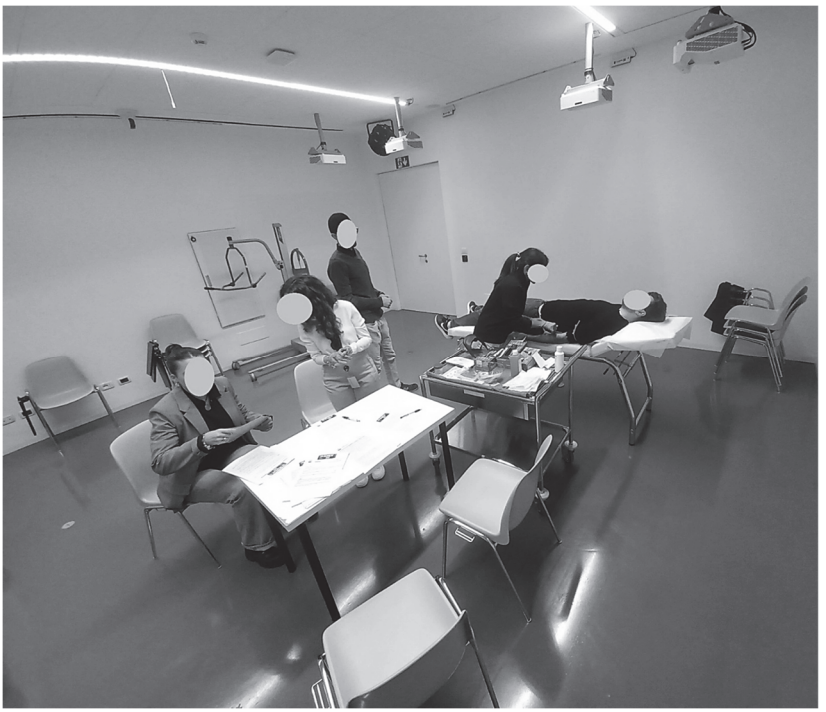
- International Cooperation and Volunteering service.

DAY 2
- Clinical risk management (an history case about a chemotherapeutic drug administration).
- Quality and safety and introduction to Joint Commission International standards.
- Patient flow: from admission to discharge.
- Dress code in the hospital (management of gowns, non-use of nail polish, wrist watches, bracelets, etc.).
- Personal protective equipment (PPE).
- The Hospital Information System (SHI): computerized medical records, inpatient, outpatient, operating log, Prescription and Medication Administration Record (PMAR).
- Nursing care organization in hospital wards (according to the model by small teams and by complexity of care).
- Hygiene and hospital infections.
- "Campus Sharing" (student association for recreational activities).
- "Campus Life": recreational and educational activities.
- "ASD Campus": sport activities.
- Non-compliance in the transfusion.

DAY 3 - Interactive Activities
- Small group discussion session of a clinical bioethics case (reconstructive surgery following neoplastic disease).
- A role-play on a liver biopsy procedure inside the Simulation Center with the aim of introducing doctors to quality and safety procedures (patient identification, hand hygiene, patient education: information notes and collection of informed consent, etc.). This activity was played in our simulation center, with hospital beds, paper/informatics documentation, with all necessary instruments: from sterile gloves to clinical instrumentation. The residents who participated to this session had to study a script and impersonate 2 structured physicians. Two students at the Theatre School of our University were trained to play the role of a patient and his wife (with the mandate to be a "communicatively demanding" wife). One of our registered nurses had to make "pre-determined" mistakes such as incorrect patient identification (anytime information about a patient is recorded or accessed – from sign-in sheets to online scheduling systems to electronic health records. Because this process is universal, it is fraught with risk for wrong-patient errors), incorrect transport of biological specimens

etc. Other students had the task of recording the errors they noticed during this session on a special observation sheet and then we made a single plenary session to debrief all together (Fig. 1).

Fig. 1 – Liver Biopsy role play



- Treasure Hunts: the various groups competed inside the hospital (Fig. 2) following and collecting the clues scattered in the various clinical areas of the hospital (blood collection center, morgue, transfusion center, diagnostic imaging area, etc.).
- Final team building activity: the "Paper Airplane challenge": interdisciplinary teams had 3 days to accomplish this mission: "*Your group has started an Airline company. You have to give a NAME to your company and think of a Flag/Standard that represents ALL the members of your Team. You have to draw your FLAG freehand or with graphics programs or online software. On the last day, you will have to explain to your colleagues the "why" of the name and flag you have chosen (60 seconds per team). During the last day there will be the aviation competition. A representative of each group will launch a paper plane (that you will make*

at home and that will have your flag and the name of the company on it). The group that launches the plane the furthest will win" (Fig. 3).

Fig. 2 – Treasure Hunt

Fig. 3 – Paper Airplane Challenge

Results

In Table 1 we report the data collected from the assessment questionnaire administered to the students BEFORE each Resident Day.

Since we only have two years (2022 and 2024) and a single percentage for each year, the appropriate test for each row is a Chi-Square test for two proportions (equivalent to the z^2 test).

Tab. 1 - Assessment Questionnarie 2022 vs 2024

TECHNICAL SKILLS 2022 vs 2024					
Question	**Answers**	**2022 Total**	**2024 Total**	**2022 vs 2024**	**Chi-Square**
Have you ever preformed an Arterial blood gases (ABG)? *(more than an answer possible)*	I had a detailed instruction on how to perform ABG	41 (28%)	35 (26%)	- 2%	$\chi^2 = 0.16$ $p = 0.69$
	I only performed the arterial sampling	30 (21%)	40 (30%)	+ 9%	**$\chi^2 = 3.27$ $p = 0.071$**
	I have never had a lesson on how to perform arterial sampling	32 (22%)	25 (19%)	- 3%	$\chi^2 = 0.43$ $p = 0.51$
	I have never developed an ABG by inserting the syringe into the device	21 (14%)	19 (14%)	=	$\chi^2 = 0.0$ $p = 1$
	I never performed an arterial sampling	70 (48%)	58 (44%)	- 4%	$\chi^2 = 0.57$ $p = 0.45$
The only response showing a significant change (although not significant at $p < 0.05$) is "*I only performed arterial sampling*," which increases from 21% to 30% ($p \approx 0.07$). This is an increasing trend, but it does not reach statistical significance. All other percentage differences are small and statistically insignificant.					
Have you ever taken a blood sample from a patient?	< 5 on patients.	52 (36%)	40 (31%)	- 5%	$\chi^2 = 0.58$ $p = 0.45$
	> 10 on patients	35 (24%)	26 (18%)	- 6%	$\chi^2 = 1.54$ $p = 0.21$
	Only on a simulator	11 (8%)	9 (7%)	- 1%	$\chi^2 = 0.09$ $p = 0.77$
	Never performed	47 (32%)	58 (44%)	+ 8%	**$\chi^2 = 3.35$ $p = 0.067$**
The only line showing a significant trend ($p \approx 0.07$) is "Never performed," which increases from 32% (2022) to 44% (2024). This indicates a possible growth in the number of students who have never had a blood sample drawn. All other differences (≤ 5-6 percentage points) are small and not statistically significant.					

Have you ever taken a patient's pulse and blood pressure?	YES	142 (98%)	130 (98%)	=	$\chi^2 = 0.0$ $p = 1$
	NO	3 (2%)	3 (2%)	=	$\chi^2 = 0.0$ $p = 1$
No percentage differences					
Medical History of the patient	I do not remember having lectured on the subject or ever having done so	4 (3%)	5 (4%)	+ 1%	$\chi^2 = 0.18$ $p = 0.67$
	I have never personally collected and written a medical history, but I know how to do it	11 (8%)	21 (16%)	+ 8%	**$\chi^2 = 3.13$ $p = 0.077$**
	I have collected and written less than 5 medical histories in my training course	18 (12%)	24 (18%)	+ 6%	$\chi^2 = 0.96$ $p = 0.33$
	I have collected and written more than 5 medical histories in my training	112 (77%)	83 (62%)	- 15%	**$\chi^2 = 7.15$ $p = 0.0075$**
The percentage of students who wrote more than five medical histories decreased from 77% (2022) to 62% (2024), a statistically significant difference ($p \approx 0.0075$). The item "I have never personally collected..." showed an increase from 8% to 16%, with a $p \approx 0.08$, thus a trend that is not yet significant.					

As for haemogasanalysis (ABG), we note the fact that there has been greater practical training.

“Only arterial sampling” has increased by 9% (compared to 2022) while the students who had not received any training on ABG have gone from 22% to 19% (-3%), suggesting better initial university training.

The students who had “Never performed an arterial sampling” have gone from 48% to 44% (-4%), it means that more students have acquired experience during their previous training.

About the ability to perform blood sampling, we recorded a general decrease in practical experience on patients, with a significant increase in those who had never performed a blood sampling (+8%). This could mean that fewer practical opportunities for students during their previous university career, considering that simulator practice also decreased by 1%.

Finally, regarding the collection of the “Patient’s Medical History” we recorded a significant decrease in those who collected more than 5 clinical histories (-15%), which suggests a reduction in practical experience in this area, with more students who stop at theoretical rather than practical knowledge.

The following data (Table 2) compares the level of perceived familiarity with the PUCMB environments during the Resident Day of 2022 (RD22), in which the

"Treasure Hunt" (TH) **was not used**, and the Resident Day of 2024 (RD24), when the gamification activity "Treasure Hunt" was introduced.

Tab. 2 - Fair scores familiarity with environments

	Δ Pre-Post 2022	Δ Pre-Post 2024
1 = no knowledge of the environments	- 19%	- 27%
2	- 18%	- 12%
3	=	- 16%
4	+ 10%	- 1%
5	+ 6%	+ 4%
6	+ 13%	- 2%
7	+ 9%	**+ 12%**
8	- 2%	**+ 11%**
9	+ 2%	**+ 9%**
10 = maximum knowledge of the environments	- 1%	**+ 12%**

Next graphs (Fig. 4 & 5) show the comparison between the "pre" and "post" training situation in the two years (2022 and 2024) about perceived level of familiarity with the Hospital areas.

Fig. 4 – Training without Treasure Hunt

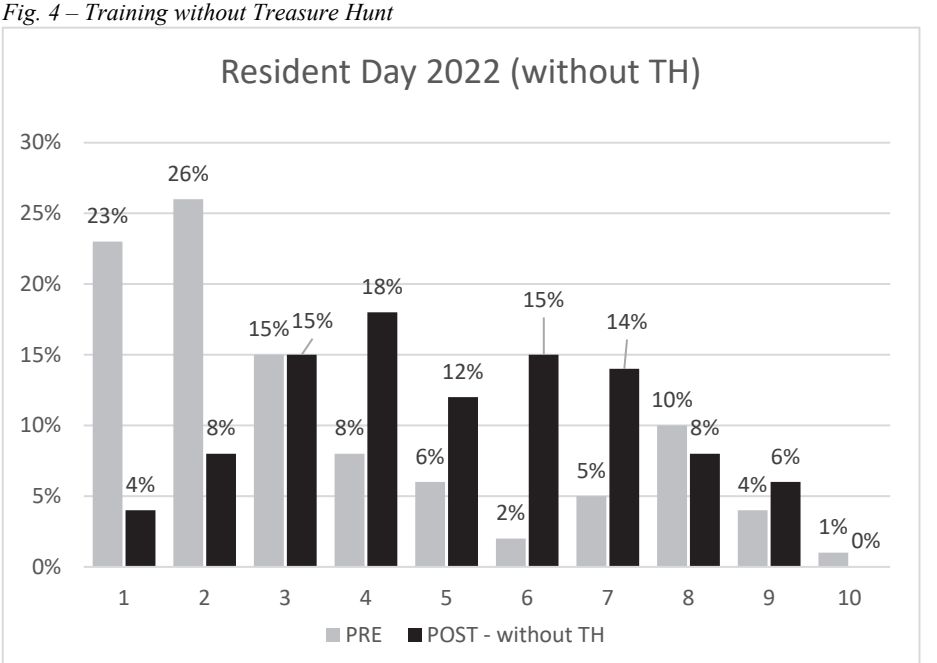
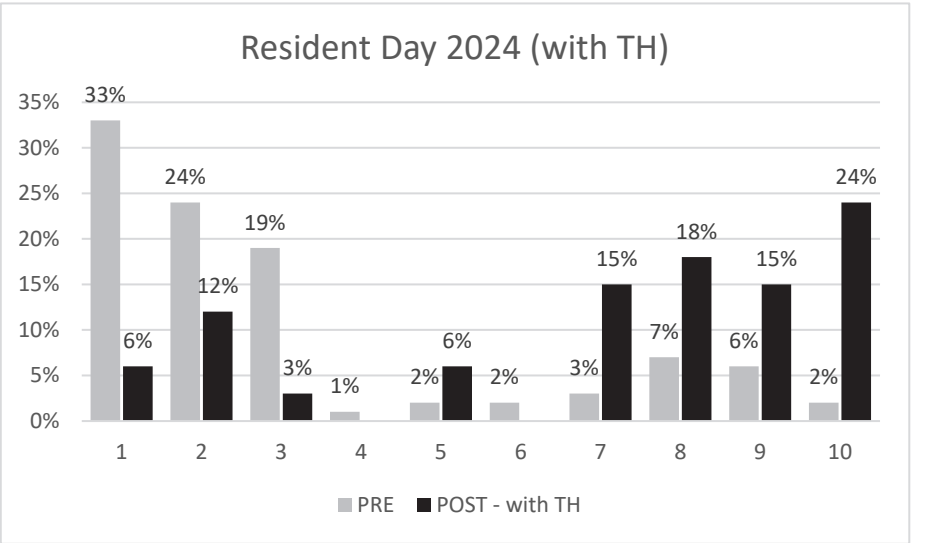


Fig. 5 – Training with Treasure Hunt



We applied the Mann–Whitney U test (a nonparametric statistical test used to compare two independent groups). If $p < 0.05$, the distributions of the two groups are significantly different:

- $U \approx 2500$
- $p < 0.001$ (highly significant)

The distribution of post-training scores is significantly different between RD2022 and RD2024.

RD2024 has a greater concentration of high scores (8-10), while RD2022 is more centered on average scores (4-7).

This indicates that the introduction of the Treasure Hunt resulted in a significant improvement in familiarity with the environments.

Resident Day 2022

Pre-RD2022 (light gray): Most people report a very low level of familiarity (scores 1-3), with a gradual decline as scores increase.

Post-RD2022 (black): There is a shift toward the middle range (scores 4-7) and a reduction in the lowest scores, indicating an overall improvement in familiarity.

Resident Day 2024

Pre-RD2024 (light grey): There is a higher spike in score 1 (over 30%), it means that, before training, many more people had almost zero knowledge of hospital environments than in 2022.

Post-RD2024 (black): The improvement is more marked than in 2022. Low levels (1-3) decrease dramatically, while high scores (8-10) increase significantly, with level 10 exceeding 20%.

Thus, the data shows that, in 2024, training with Treasure Hunt's interactive learning was more effective in moving people from the lowest levels of knowledge (1-3) to the highest levels (8-10).

In fact, the level of "unfamiliarity" (score 1) decreased by 27% in 2024, compared to a 19% decrease in 2022.

Meanwhile, the shift to higher scores (8-10) is much more consistent in 2024, with increases of 11%, 9% and 12% for levels 8, 9 and 10 respectively, while in 2022 the increases were much more limited (or even negative).

So, in 2024, more people started from a very low level of knowledge than in 2022, but after training the improvement was more marked. The data suggests that the introduction of the "Treasure Hunt" gamification contributed to a more marked increase in high scores, while at the same time reducing the share of those who maintained very low levels of familiarity.

Analysis of practical activities

Even though all practical activities obtained high scores (at least 3.4 - 4.3 out on a range scale 1-5), (which indicates a positive appreciation by the participants), some of them turned out to be less "understood" by the participants.

In particular (Table 3) the most marked difference was found in the Teamworking Challenge session: the session was perceived as less useful in the RD24 (having however recorded an excellent score of 3.8 out of 5.0), which could however indicate problems related to the way it was carried out, the perceived relevance or other variables related to the training experience.

In fact, this means that the "Egg Challenge" was more appreciated and more perceived as "useful" than the "Paper airplane challenge".

Tab. 3 Perceived usefulness

Practical sessions 5-point Likert scale 1 (Not at all useful) to 5 (Very useful)	**Average Post RD22**	**Average Post RD24**
Covid dressing and undressing	4,2	n.a.
Role play on liver biopsy	4,2	4,0
Problem solving	4,1	n.a
Clinical bioethics case	4,2	4,3
Teambuilding's challenge	4,1	3,4
Treasure Hunt	n.a.	3,8

Similar ratings in common sessions show some consistency in training quality. However, the decrease in teambuilding scores in RD24 may indicate the need to review the format or approach used to engage participants.

Discussion

This study highlights the efficacy of a structured, multi-modal orientation program in enhancing early clinical competence and hospital integration among newly enrolled residents.

Comparative analysis between the 2022 and 2024 cohorts revealed notable shifts in self-reported technical skill acquisition and institutional familiarity - particularly in procedures such as arterial blood gas sampling and clinical history taking.

For **Arterial blood gas sampling (ABG),** there is an improvement in hands-on training, with a 9% increase in students who performed arterial sampling only.

Additionally, the number of students who had never received a class on ABG decreased by 3%, suggesting an improvement in basic university teaching.

The number of students who had never performed arterial sampling also decreased by 4%, indicating increased hands-on exposure.

In contrast, for blood sampling, there was an overall decline in hands-on experience, with an 8% increase in students who had never drawn a blood sample. This may reflect a reduction in hands-on learning opportunities in the curriculum. Furthermore, 1% decrease in simulator practice suggests that this reduction was not offset by an increase in simulated activities.

About the **clinical history taking**, there is a 15% decrease in students who collected more than five clinical histories during university training. At the same time, there is an 8% increase in students who declare to have only theoretical knowledge on the subject. These data suggest a change in the training approach, with a possible reduction of direct practical experience in favor of a greater emphasis on theory.

These results suggest incremental improvements in pre-residency training, but also emphasize the continuing need for robust, hands-on onboarding frameworks.

A key innovation in the 2024 program was the integration of **gamification –** specifically the "Treasure Hunt" – which significantly improved spatial orientation within clinical environments. This supports the broader literature on experiential and game-based learning, which posits that **active engagement with physical space** accelerates cognitive mapping, retention, and motivation

(Ulmanen et al., 2014). The increased transition from low (1-3) to high familiarity scores (8-10) in 2024 – despite a lower baseline – underscores the pedagogical value of immersive learning design.

While in 2022 students were more evenly distributed between the medium and high levels, in 2024 many reached the maximum levels (10) resulting in more students reaching the maximum levels of familiarity with hospital environments, despite a lower starting point, a sign of a more effective acquisition of familiarity

The practical sessions highlight that, although the perception of the usefulness of the training activities remained generally high, some sessions underwent variations in the level of appreciation.

In particular, the teambuilding Airplane challenge obtained a lower score in 2024 compared to the Egg-challenge of the 2022, suggesting the need for a possible review of the format or the approach adopted.

The mixed outcomes in the perceived usefulness of practical activities, particularly the decline in appreciation for the Paper Airplane teambuilding challenge, point to the importance of aligning learning objectives with perceived clinical relevance. While creativity and collaboration are important, simulations that closely mimic medical contexts (e.g., the liver biopsy role-play) yielded higher engagement and learning transfer. This finding echoes cross-disciplinary insights from medical simulation, behavioral psychology, and instructional design - where **authenticity and scenario fidelity** are known to enhance performance and satisfaction.

However, the consistency in the scores of the other activities confirms the overall training quality of the program. The small improvements (such as in the bioethics clinical case) are encouraging and indicate that any changes made to the RD24 course had positive effects in some areas.

These data underline how practical experience is a key element in medical training and suggest the need to further strengthen active learning opportunities to improve students' technical skills.

Overall, the Resident Day program exemplifies a shift in orientation practices from passive information delivery to active, participatory learning. It contributes to a growing body of evidence that underscores the role of **experiential learning**, **interdisciplinary collaboration**, and **gamified design** in preparing residents not only for procedural competence, but also for systems navigation, communication, and resilience.

These insights are transferable to global residency settings facing similar onboarding challenges. Future research might explore longitudinal outcomes (e.g., error reduction, burnout, clinical efficacy), multi-site replication, and cross-cultural adaptation of this orientation model.

Conclusions

The overall analysis highlights how a structured and innovative orientation program can significantly improve the preparation of new residents, promoting not only the acquisition of technical skills, but also a rapid familiarization with the hospital environment.

While orientation programs are common in North America and Northern Europe (Brillman, 1995; McGrath, 2017), the PUCBM experience demonstrates a structured, culturally grounded, and scalable approach relevant across health systems facing similar onboarding challenges.

The integration of active teaching methodologies – such as role-play, Treasure Hunt and other practical activities – allowed us to bridge, in a short time, the gap between theory and practice, highlighting a positive impact on the levels of knowledge and security perceived by participants. This study suggests gamified exploration enhances spatial memory and orientation, supporting the use of play-based design in complex learning environments.

However, some training moments, such as the teambuilding Airplane challenge in RD24, showed room for improvement, suggesting the need to refine the format to optimize involvement and effectiveness.

These results underline the importance of investing in evidence-based orientation programs that support the critical transition from academic training to clinical practice, reducing the risk of disorientation and burnout and promoting the development of competent and resilient professionalism in an increasingly complex healthcare context.

Practice Points

1. **Adopt multi-modal onboarding:** Combine lectures, simulations, and gamified activities to bridge theoretical knowledge and clinical practice for new residents.
2. **Use gamification to boost hospital orientation:** Interactive games like treasure hunts can significantly improve spatial awareness and familiarity with hospital workflows.
3. **Prioritize experiential learning:** Role-playing and simulations of clinical procedures enhance early technical skill development and understanding of safety protocols.
4. **Align team-building activities with non-clinical relevance:** Design activities that foster collaboration and engagement across different residency backgrounds, not only clinical specialties.

5. **Continuously evaluate and refine orientation programs:** Regular assessment of participant feedback and outcomes ensures ongoing improvements in training quality and resident satisfaction.

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