https://doi.org/10.22516/25007440.940

Review article

Current Approach to Training and Assessing New Generations of Endoscopists

María del Carmen Figueredo,[1*] Reinaldo Rincón-Sánchez.[2]

OPEN ACCESS

Citation:
Figueredo MC, Rincón-Sánchez R. Current Approach to Training and Assessing New Generations of Endoscopists. Revista. colomb. Gastroenterol. 2024;39(1):62-67. https://doi.org/10.22516/25007440.940

[1] Internal Medicine Physician, Gastroenterology Fellow, Hospital Universitario San Ignacio. Bogotá, Colombia.
[2] Specialist in Gastroenterology and Digestive Endoscopy. Gastroenterologist, Fundación Clínica Shaio and Hospital Universitario San Ignacio. Bogotá, Colombia.

***Correspondence:** María del Carmen Figueredo.
m.figueredo@javeriana.edu.co

Received: 10/09/2022
Accepted: 25/09/2023

Abstract

Esophagogastroduodenoscopy (EGD) is a diagnostic and therapeutic study for various upper gastrointestinal tract diseases. It is a fundamental part of the education and training fellows receive in gastroenterology programs, focusing on developing skills to perform it safely, effectively, and efficiently and master the technique. Historically, value has been attached to the number of procedures required to acquire skills; there is a discrepancy in the recommendations by scientific societies regarding the "ideal" number to meet the minimum requirements and learn the necessary skills. However, each student has different innate and developed abilities that make this process asymmetric.

Adopting a combined training approach (observation, clinical practice, and simulation) is the best method to learn diagnostic EGD. We are facing a generation with forms of learning different from those traditionally implemented, which implies an ongoing process of training and updating for endoscopists dedicated to teaching.

Keywords

Student Health Services, Esophagogastroduodenoscopy, Teaching, Learning, Clinical Competence.

INTRODUCTION

Esophagogastroduodenoscopy (EGD) serves as a pivotal diagnostic and therapeutic tool for various upper gastrointestinal tract disorders. It plays an essential role in the educational foundation and training of gastroenterology fellows, emphasizing the cultivation of skills necessary for its safe, effective, and efficient execution with thorough technical proficiency[1,2].

This involves nurturing both cognitive and psychomotor abilities, alongside temporal-spatial correlation skills, which are applied to three-dimensional spaces for examination or intervention[3]. Currently, a standardized methodology for EGD training is absent, leading to significant variability across adopted educational frameworks[1,2,4].

The conventional training model is built around two core principles: the first advocates for observing procedures performed by experts, engaging in supervised practice, and subsequently gaining experience, encapsulated by the "see, do, and teach" mantra[2,4]. Although this approach has merits, it has also introduced challenges in learning customization and the depth of knowledge acquired[3]. The second principle focuses on the volume of EGD procedures as a metric for procedural proficiency, yet this is subject to debate among scientific societies over the optimal procedure count, highlighting that such metrics serve merely

as benchmarks rather than guarantees of comprehensive learning[1,2,4]. This method of instruction should not be perceived as deficient; rather, both principles are seen as mutually enriching.

It is advocated that the EGD training regimen should be meticulously structured and evaluated at each stage to ensure superior quality and safety, urging a collective effort towards the establishment of a standardized protocol[1]. In response, there is a movement towards integrating alternative educational strategies, such as skill-based pedagogy. This approach leverages didactic and cognitive resources combined with practical instruction[3], aiming to foster competencies, namely a foundational level of knowledge, skill, and experience derived from training, alongside the essential ability to perform interventions with confidence and effectiveness[3]. This methodology promotes individualized learning trajectories, acknowledging the variability in learning styles and speeds among students[5].

A proposed strategy to enhance training frameworks and align them with the expectations of new generations of gastroenterologists includes the adoption of innovative approaches inspired by educational theory, incorporating online learning, digital technologies, and social networking tools[2,6]. This leads to the recommendation of conducting a review that delves into the core aspects of learning, offering an integrated approach to maximize the efficacy of the EGD training process.

TRADITIONAL APPROACHES TO ESOPHAGOGASTRODUODENOSCOPY EDUCATION

The educational methods for instructing fellows in the performance of EGD exhibit a considerable range of variability[4]. Historically, endoscopy education has taken place within the clinical setting, primarily relying on a mimicry-based learning system. This approach posits that hands-on patient experience is paramount, as it allows for direct engagement with procedures in the "real world"[1,2]. However, this traditional model is inherently flawed due to its lack of standardization, potentially leading to poor decision-making and the formation of inappropriate practices[1]. Additional limitations include extended duration of procedures, dependency on a patient population willing to undergo procedures by students, and an increased risk to patient safety[1]. These concerns underscore the significance of incorporating observation phases into the EGD training, preceding any hands-on patient experiences.

Within this traditional framework, the transfer of knowledge occurs as educators relay their expertise. Yet, it is critical to acknowledge that not all endoscopists are equipped with teaching skills, and extensive experience does not automatically equate to effective instructional capabilities[2]. To address these gaps, a variety of methodologies have been proposed to enhance the learning process. Among these is an active learning approach, emphasizing competency-based education—a model that shifts focus from the educator to the learner, aligning with adult learning principles[7]. This strategy advocates for a move from mimicry-based to competency-focused learning, tailored to the individual's intrinsic attributes, prior knowledge and experience, exposure to varying pathologies, and access to resources[3].

TRAINING OBJECTIVES IN ENDOSCOPIC PROCEDURES

The core objectives of endoscopic procedure training encompass both the acquisition of theoretical knowledge and the honing of technical skills. Despite being a generally safe practice, the inherent risk of complications necessitates the ability to perform procedures with high quality and minimal patient risk[1]. These objectives constitute fundamental pillars for training programs in digestive endoscopy, as the proficient and secure execution of EGD, coupled with an adept mastery of the technique, stands as a central goal for fellows in gastroenterology during their training trajectory[2].

Historically, the objective assessment of skill acquisition in endoscopic procedural training has been delineated by a prescribed minimum quantity of procedures, theoretically culminating in technical mastery[1,2,4]. However, inherent and cultivated skill disparities amongst students engender an asymmetrical progression in this process[3]. The attainment of requisite competencies upon the culmination of the training process is defined by the American Society for Gastrointestinal Endoscopy (ASGE) as the "minimal level of skills, knowledge, or expertise derived from training and experience that is necessary to execute a procedure safely and competently"[4].

While these mandated minimal standards in procedural volume are pertinent, they emanate from expert consensus or the deliberations of prominent scientific societies and should merely serve as guidelines, given that they do not ensure competence acquisition, which can vary contingent upon the assessed skill (both technical and cognitive)[2,8]. Thus, this parameter ought to be construed as a surrogate for competency attainment, coalescing with milestone evaluations, endoscopic findings interpretation, and their integration into holistic patient care[2,8].

Traditionally, the requisites for conducting endoscopic procedures have been dichotomized into two fundamental skill domains: technical and cognitive, crucial for furnishing quality care. Nonetheless, these are deemed inadequate, prompting the emergence of integrative skills, deemed indispensable and recognized for their role in mitigating

the risk of adverse events, as deficiencies in behavior and communication may yield a greater propensity for errors when juxtaposed against technical knowledge deficits[9].

A lucid comprehension of the minimal competencies requisite for executing high-quality endoscopic procedures is imperative for delineating an evaluative framework. It necessitates conceptualization within the purview of three cardinal competency domains: technical, cognitive, and integrative, with the primary domains expounded upon in **Figure 1**[9].

THE ROLE OF SIMULATION IN EGD EDUCATIONAL AND LEARNING PROCESSES

In the realm of medical education, simulation-based learning caters specifically to adult education, utilizing audiovisual aids, such as multimedia and clinical case resolution, along with technological tools[4].

The introduction of simulation models before patient engagement, coupled with the systematic approach to EGD instruction and learning in clinical phases, serves a supplementary function. This approach contributes to mitigating the risks or unwarranted discomfort that patients might otherwise endure[10]; it also allows fellows to concentrate on mastering technical skills, expedite the learning trajectory, and assimilate various requisite skills for procedural execution, encompassing technical, cognitive, methodological, and communicative abilities[2]. Furthermore, simulation aids in the assessment of integrative competencies like communication and teamwork[9], and it provides a structured platform for the diversification of clinical scenarios[11].

The advantages of simulation-based training for EGD are most pronounced when employed early in the training sequence. However, these benefits diminish after the completion of about 50 EGD procedures[12]. An array of simulators exists, including mechanical models featuring obstacles and tasks of differing complexities, live animals, *ex vivo* organs from animal cadavers, and virtual simulators[13]. These simulators have been effective in enhancing skill acquisition for colonoscopies and the execution of hemostatic procedures, though the consistency of these outcomes across various studies remains debatable. Furthermore, the definitive impact on clinical practice, patient safety, and the health care cost-benefit analysis is yet to be fully established[1]. Notwithstanding this limitation, initiating any potentially risky learning process with simulation is considered prudent[1].

The ASGE, in 2012, underscored the importance of embracing simulation, stressing two pivotal considerations: first, simulation has the potential to reduce by 25% the number of cases that trainee gastroenterologists must undertake to achieve essential EGD competencies; second, performance metrics derived from simulation activities can exhibit a correlation with actual minimum competency standards (kappa of 0.7 or higher)[14]. Despite the clear benefits, the efficacy of simulation-based education is not universally acknowledged. Its utility diminishes, for instance, when conducted in the absence of feedback from

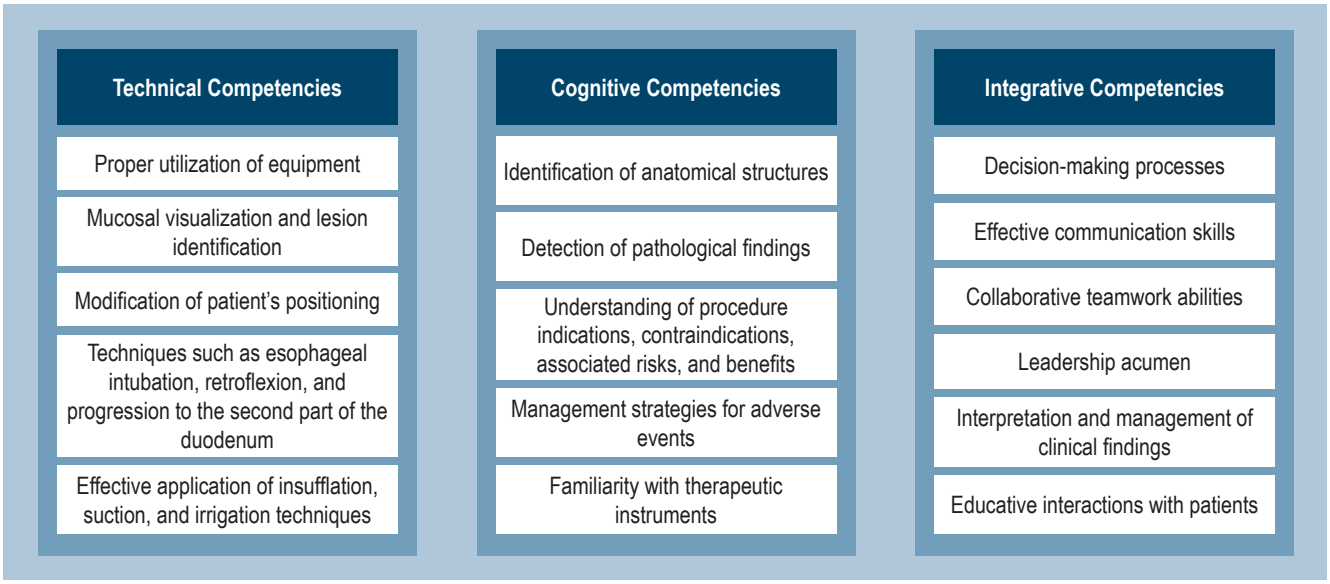

Figure 1. Core Competency Domains. Adapted from: Walsh CM. Best Pract Res Clin Gastroenterol. 2016;30(3):357-374[9].

instructors, signifying that its integration into training programs must be deliberate, reflective[10], and evidence-based to optimize the learning benefits while justifying the related expenses[10].

As detailed in the review by Khan and colleagues[10], simulation-based education centers on four principal practices, delineated in **Figure 2**. In conclusion, incorporating a blended training model that includes observation, clinical practice, and simulation represents the optimal strategy for learning the intricacies of performing an EGD[2].

RECOMMENDATIONS FROM INTERNATIONAL SCIENTIFIC SOCIETIES

Building upon the aforementioned premise concerning the significance of both the quantity of endoscopic procedures conducted and the acquisition of competencies, there exists variability in the recommendations provided by various scientific societies in gastroenterology and digestive endoscopy regarding the "optimal" quantity of procedures necessary to fulfill minimum requirements and attain requisite skills[1,2]. **Table 1** delineates the extant guidelines.

Table 1. Required Number of EGD Procedures for Skills Acquisition as Recommended by Various Scientific Societies

Organization	Number of EGDs
American Society for Gastrointestinal Endoscopy	130
British Society of Gastroenterology	300
European Union of Medical Specialists	300
Korean Society of Gastrointestinal Endoscopy	1000
Gastroenterological Society of Australia	200

Adapted from: Kim JS, et al. Clin Endosc. 2017;50(4):318-321[2].

HOW TO EVALUATE PERFORMANCE?

The role of evaluation transcends merely cataloging what has been learned; it should also act as a catalyst for transformation, serving as a critical source of feedback for educators, programs, and students alike. This evaluative process aims to gauge the effectiveness of educational initiatives,

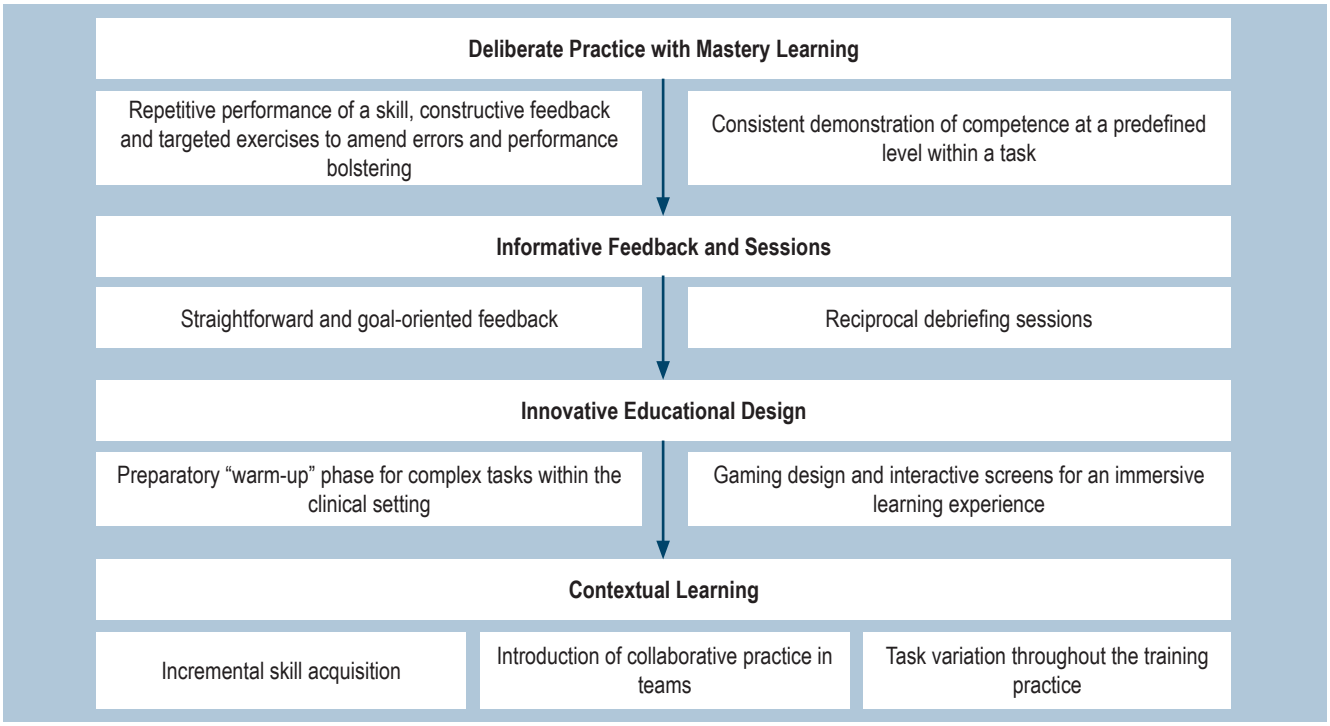

Figure 2. Simulation-Based Education. Adapted from: Khan R, et al. World J Gastrointest Endosc. 2019;11(3):209-218[10].

pinpointing strengths and identifying weaknesses among all involved parties, thus paving the way for dynamic, progressive, and systematic enhancements that align with established learning objectives[3].

Furthermore, evaluation constitutes a key component of the instructional process across various disciplines. To execute this, a diversity of models or strategic approaches may be employed. When these are applied in a complementary manner to an individual student, they afford a more nuanced appreciation of their skillset and highlight areas ripe for improvement[15]. Integral to this assortment is Miller's model, which delineates a structure for appraising competency-based education, presuming predictive capability for performance across four dimensions: "knows", "knows how", "shows how," and "does"[15]. However, while offering a comprehensive framework for evaluation, it does not account for the interplay between performance and competence, prompting the introduction of the Cambridge model, which contemplates the impacts of systemic and individual influences[15].

FUTURE PERSPECTIVES

- The competency-based approach stands out as a valuable tool for assessing milestones, along with technical and cognitive proficiencies.
- Incorporation of simulation-based instruction is recommended within the training curriculum for fellows specializing in gastroenterology and digestive endoscopy.

CONCLUSIONS

Competence assessment must be an integral element of the training regime for gastroenterology fellows, not limited to considering the quantitative metrics of procedures performed. While these figures hold significance, they should not be the sole determinant of competence.

The pedagogy of EGD should be inherently motivating rather than punitive for fellows, offering educators a dynamic platform to disseminate their expertise in an engaging and interactive fashion.

Acknowledging that each student assimilates skills (technical, cognitive, and integrative) at their own pace, personalized guidance and constructive feedback become indispensable.

We stand before a generation characterized by learning styles distinct from traditional norms, necessitating continual professional development and instructional renewal for endoscopists who teach. Embracing a multifaceted training strategy that blends observation, clinical practice, and simulation emerges as the optimal pathway for mastering both diagnostic and therapeutic EGD, potentially hastening the progression of learning trajectories.

REFERENCES

1. González R, Rodríguez A, Buckel E, Hernández C, Tejos R, Parra A, et al. Sistematización de un programa de entrenamiento en endoscopia digestiva alta diagnóstica en ambiente simulado y curvas de aprendizaje en pacientes reales. Gastroenterol Latinoam. 2012;23(4):191-196.
2. Kim JS, Kim BW. Training in endoscopy: Esophagogastroduodenoscopy. Clin Endosc. 2017;50(4):318-321. https://doi.org/10.5946/ce.2017.096
3. Rincón R, Puentes G, Vargas, Emura F. Estrategias de enseñanza en endoscopia de vías digestivas. En: Cañadas R, Vargas R, Rincón R, Jaramillo S, Puentes G (editores). Currículo nuclear en endoscopia digestiva. Fundamentos teóricos y propuesta curricular. Bogotá: Panamericana; 2018. p. 47-66.
4. Forbes N, Mohamed R, Raman M. Learning curve for endoscopy training: Is it all about numbers? Best Pract Res Clin Gastroenterol. 2016;30(3): 349-356. https://doi.org/10.1016/j.bpg.2016.04.003
5. Taullard, D. Capacitación y certificación. En: Saénz R (editor). Guías para mejorar la calidad de la endoscopia digestiva. Santiago de Chile: Talloni; 2010. p. 20-28.
6. Soetikno R, Kolb JM, Nguyen-Vu T, Jayasekera C, Bogie R, Yu J, et al. Evolving endoscopy teaching in the era of the millennial trainee. Gastrointest Endosc. 2019;89(5):1056-1062. https://doi.org/10.1016/j.gie.2018.11.027
7. Harden RM, Crosby J. The good teacher is more than a lecturer - the twelve roles of the teacher. Med Teach. 2000;22(4):334-347.
8. Han S. Achieving Competence in Endoscopy. ACG Case Reports J. 2019;6(8):e00155. https://doi.org/10.14309/crj.0000000000000155
9. Walsh CM. In-training gastrointestinal endoscopy competency assessment tools: Types of tools, validation and impact. Best Pract Res Clin Gastroenterol. 2016;30(3):357-374. https://doi.org/10.1016/j.bpg.2016.04.001
10. Khan R, Scaffidi MA, Grover SC, Gimpaya N, Walsh CM. Simulation in endoscopy: Practical educational strategies to improve learning. World J Gastrointest Endosc. 2019;11(3):209-218. https://doi.org/10.4253/wjge.v11.i3.209
11. Singh S, Sedlack RE, Cook DA. Effects of simulation-based training in gastrointestinal endoscopy: a systematic

review and meta-analysis. Clin Gastroenterol Hepatol. 2014;12(10):1611-1623. https://doi.org/10.1016/j.cgh.2014.01.037
12. Woods K. Simulators in training for upper gastrointestinal endoscopy. Grastroenterol Hepatol. 2019;15(4):207-209.
13. Blackburn SC, Griffin SJ. Role of simulation in training the next generation of endoscopists. World J Gastrointest Endosc. 2014:16(6):234-239. https://doi.org/10.4253/wjge.v6.i6.234
14. Cohen J, Bosworth BP, Chak A, Dunkin BJ, Early DS, Gerson LB, et al. Preservation and incorporation of valuable endoscopic innovations (PIVI) on the use of endoscopy simulators for training and assessing skill. Gastrointest Endosc. 2012;76(3):471-475. https://doi.org/10.1016/j.gie.2012.03.248
15. Aponte D. Del aprendizaje por imitación al aprendizaje por competencias. En: Cañadas R, Vargas R, Rincón R, Jaramillo S, Puentes G (editores). Currículo nuclear en endoscopia digestiva. Fundamentos teóricos y propuesta curricular. Bogotá: Panamericana; 2018. p. 37-46.