

Adult education. Gastroenterology training today

Educación en el adulto. Entrenamiento en gastroenterología

Roque Sáenz^{1,2,a}

¹ The Latin-American WEO Gastrointestinal Endoscopy Training Center Clinica Alemana.

² Universidad del Desarrollo Santiago Chile.

^a MD

Recibido: 03/01/2013; Aceptado: 04/02/2013

RESUMEN

La educación en gastroenterología ha cambiado en los años recientes y el criterio de calidad es ahora la meta principal. La educación en el adulto no es intuitiva sino que tiene que ser aprendida. En nuestros días la educación del post graduado en gastroenterología necesita de periodos mayores de aprendizaje debido al desarrollo constante de nuevas técnicas y también porque el e-aprendizaje y la e-enseñanza han entrado al ruedo.

Palabras clave: Educación médica; Educación de postgrado; Gastroenterología (fuente: DeCS BIREME).

ABSTRACT

Gastroenterology education has changed in recent years and the quality criteria are now the aim of it. Adult education is not intuited, it is to be learned. In our days post graduated education needs longer periods of training, because of the everyday development of new techniques and also because the e-learning /e-teaching has appeared in the arena.

Key words: Education, medical; Education, graduate; Gastroenterology (source: MeSH NLM).

OVERVIEW⁽¹⁻³⁾

Over the last two hundred years or even twenty years, there have been enormous changes on medical education and practice and its evolution is permanently evolving.

The requirements of "Quality Criteria" knowledge, teaching, practicing and demanding for the new generations of gastroenterologists, do guide somehow the actual forms of working and signals the aims of the specialty curricula.

The artisanal doctor/teacher imparting knowledge and skills to the apprentice/student is still there, but EBM, the computer age and the consequent explosion of knowledge means developing new and better methods of teaching and learning.

Adult education is not intuitive, it is to be learned.

Didactic Lecturing means also that the lecturer is a skilled one at teaching and could disseminate the knowledge to a student body, which knew how to focus and concentrate, and to learn.

Gastroenterology education should be oriented in the pre-graduate phases, to be integrated transversal and vertically, with inclusions and interactions coming from physiopathology, pharmacology, epidemiology, surgery, medical clinics, etc, permitting to the general practitioner, or to any area of the medical endeavor practice, to afford successfully gastroenterological cases or its daily gastroenterological problems (gastro esophageal reflux, constipation, functional disorders etc)⁽⁴⁻⁶⁾.

The next step is to deal with the post-graduate education and the CME, after being specialist incorporating permanently the new knowledge, new skills and new applications of the previous knowledge. This permanent must of being updated is called the medical "Albatross".

Post graduate education, requires nowadays, of a longer period of training and most programs have turned from two into three years⁽⁷⁻¹³⁾.

The new knowledge is responsible for that change, liver and intestinal transplant, new oncology therapy, biological therapy for inflammatory bowel diseases and chronic hepatitis, genetics and basic sciences advances, emphasizing molecular biology issues, advanced and therapeutic endoscopy, surgery interactions, sedation, new pathology and biological markers, digestive cancers prevention etc. All that enormous amount of new aspects of the gastroenterology training requires today more and more curricular segments.

Gastroenterology is even more than other specialties, an adequate mixture of knowledge, skills and attitudes.

Modern live, has brought to us half of the world population starving and the other half dealing with obesity, its consequences and treatment.

Population longer expectance of life also means older patients, and their frequent pathologies such as cancers and vascular disorders, relevant topics for the future gastroenterologist.

It is interesting to consider the permanent education, (CME), and besides the need of training in new skills.

Citar como: Sáenz R. Adult education. Gastroenterology training today. Rev Gastroenterol Peru. 2013;33(1):59-65.

Those new practical aspects could be learned in training devoted periods or again in the traditional assay and error's school.

Variations in format from seminar to workshop, from Power Point presentation to interactive overhead slide discussion, and from personal learning modules to internet searches, enable students to maintain concentration and to learn more effectively^(22-26,34).

E-learning/e-teaching has also appeared in the arena, with all its advantages and disadvantages. New generations have really been born along with them. Internet and even more Internet 2 (academic), with all the huge amount of available information, should be adequately filtered.

We are dealing now with an entire native computerized generation, they live different, they think different they are connected differently, and with their minds opened to new advances in this sense and with no surprise.

Animal labs and simulators are also available. Those resources are scarce and expensive, making the educational gap among institutions wider, but permitting on the other side the shortening of the learning curve and the avoidance of certain amount of complications^(12,14-16).

There is too much information to deal with, to know it all. Doctor is becoming besides the leader of a management team, treating the patient in conjunction with a group of health care workers who each have special skills to contribute to the recovery of the patient from illness.

Professionalism, good medical practices, (safe hours), medical ethics, justice and judicial medicine aspects should be considered in the new conception of the gastroenterology world.

Evaluation is also an issue, and it is extremely important, due to the wide variety of skills that should be understood, indicates and practice.

The assessment and appraisal of the learning should be an integrating process, utilizing the 360° manner, and ideally teaching with a tutorial one to one scheme and mentoring.

Integration with other specialties should also be considered. A patient with some determined disease should be offered of a platform of solutions, more or less complexes, trying to choose the safer, the less invasive, and the costless one, in reasonable terms.

The same problem could be afforded differently, from observation period, to pharmacy, complementary medicine, interventional radiology, therapeutic endoscopy, conventional surgery, single port, open surgery or even NOTES or the so called sub-mucosal surgery such as POEM.

Options should be known, patient and family are informed adequately choosing the best alternative, because it is available, because of its outcomes, because of the local experience and results, because of less invasiveness and risk and because of the reasonable costs.

Clinical Guidelines look like vehicles permitting, a most trustable daily problem solutions. In house protocols should be developed in order to earth touching, according to the local epidemiology and local resources (cascade concepts).

Administrative and economic concepts are necessary and should be also considered.

Accreditation of the trainers, professionals, medical and training centers should be considered as directly related with quality concepts.

Some institutions do have full teaching capacity, with a sufficient patient load of required age and gender, of different pathologies, interaction with other specialties and trainers enough to assure the global educational endeavor.

Some other institutions could also bring partial educational capacities, which should be complemented by other training centers. Other centers could also be considered thematic excellence centers devoted to serve as the confluence for several academic centers, for topics such as hepatic transplant, advanced surgical endoscopy or nutrition centers.

Those recognized requisites could be achieved by national or even transnational entities, becoming the traditional pathway to get the knowledge and academic degrees.

Some institutions certify periods of training and others bring credentialing for every procedure as it has been suggested lately.

Quality means the concepts of rewarding the performances, so those who fulfill the quality criteria adequately could get their full payment or academic recognition. On the contrary those who do not, would receive less, or even if their performance grades under the threshold, should be re-trained until the correct performance (pay for performance).

The measurable and demanded quality criteria have been considered the minimal threshold to fulfill and an ideal performance. It permits the continuous improvement as has been demonstrated with a devoted computational program of quality assessment for colonoscopy, in Rochester.

The traditional new knowledge access thanks to courses and congresses is progressively migrating to new formats such as distance training courses or e-learning/teaching.

The non presence required events, should move more and more to the electronic learning, and it is not so far, to get an international expert interactive presence somewhere in the world who is in front of you on your TV at home or even in your cell-phone screen.

The future is around the corner, or perhaps it is the present.

Diagnostic and interventional endoscopy is in continuous technological advancement in the past decades, replacing traditional surgery for many gastrointestinal disorders.

Endoscopy needs the highest standards of quality, in its widely spread use. Indications, risks and limitations should perfectly be understood. The adequate teaching is mandatory.

The performance of endoscopy requires both cognitive and technical skills, professionalism and competences. Personnel trainer/trainee supervision and interaction is essential and not replaceable. Historically, endoscopic training has consisted primarily of “learning by doing”, under the supervision of an experienced endoscopist.

Permanent improvement and adoption of new technology or new applications, (POEM, magnification, tattooing, NBI, FICE or NOTES for instance) is desired as an open mind requisite, for trainees as well as for experienced endoscopists. (CME) ⁽¹³⁾.

The American Society for Gastrointestinal Endoscopy (ASGE) and other organizations, have prepared guidelines for training in endoscopic procedures for a variety of gastrointestinal diseases.

Education in endoscopy quality control criteria, assuring the appropriateness of indication and performance, reduces costs and shortens the endoscopy unit’s waiting lists.

The learning process path could now be designed as follows: observation, simulation & ex-vivo models, hands on, workshop and practice.

The “quality control” (QC) concepts in endoscopy should be considered the final excellence outcome of the teaching process. Those concepts and other guidelines, as well as the assessment of competency of training, credentialing of training and methods of training (including use of ancillary tools such as simulators), are all in the first line of our duties.

The use and availability of teaching aids both for the learning process and for updating cognitive and technical skills should be encouraged.

Several formats of teaching aids are considered (Table 1) ⁽⁴²⁾.

Table 1. Teaching aids spectrum.

1	Text and atlas (Photographic images)
2	Electronic multimedia. E-training Video- CD- Rom- DVD- Drivers Internet and Internet 2 Home TV
3	Teaching courses Video based courses. “Simulcast” Life Courses Small Group Sessions Life remote transmission Telemedicine Centers
4	Video-analysis
5	Ancillary tools. Animal models (ex vivo) Computerized Simulator Models
6	Training Centers
8	Others

ROLE OF TEACHING AIDS ⁽¹⁷⁻²¹⁾

The question of minimal numbers of performed procedures has generated much controversy. The issue is to get competence.

Technical competency is very difficult to achieve for many procedures, particularly those that involve therapy. Nearly all individuals require considerably more cases than stated in the guidelines in order to achieve acceptable standards.

A large volume of endoscopic procedures is not practical in all training programs and therefore many endoscopists, add skills themselves after becoming facultative in basic procedures. It is important that the basic training in endoscopy be undertaken in conjunction with an experienced endoscopist.

Computer, virtual reality and model simulation use, (Colo EASIE- Erlangen, Simbionix GI Mentor, Accu Touch, etc.) is becoming popular but mentoring and personal targeted training is essential and cannot be replaced.

Trainees are all different and the individual training process is designed also differently and tailored to his attributes.

Trainee logbook records should specify particular skills completed by the fellow as well as the number of cases done without assistance.

The training process requires, according to every new skill, to fulfill the path from Unconscious Incompetence (UI) toward Conscious Incompetence (CI) and finally to Conscious Competence (CC) thanks to the practice. The Unconscious Competence (UC) is the experts attribute.

New diagnostic noninvasive armamentarium such as 3D images, Genetic testing, molecular biology etc have moved endoscopy from diagnostic to frequent therapeutic procedures, which requires the best skilled endoscopists.

Teaching aids for endoscopy are intended to enable endoscopists to perform their work more productively, to shorten the training period, to avoid complications and gets better patients safety, comfort and cost-effectiveness. The variety of available formats is meant to provide individuals with alternative means to visualize the techniques of procedure performance. These methods of observing the experts “in action” have gained utilization for both initial learning and for the upgrading of endoscopic techniques. Each of the formats has its advantages and drawbacks.

Internet (e-learning / e training)

It is with no doubt an enormous contribution to the permanent improvement in the cognitive process,

always updated, with ancillary armamentarium in images and multimedia, available almost everywhere and at anytime. It is also there for trainers as well as for trainees, and it is the same for both.

Day after day the magnitude of the information increases enormously and it should be filtered and organized. Those weapons are also available and should be learned.

The immediate answer to any clinical query or doubts solutions is to be considered permanently in or professional daily life.

Teaching courses video based, simulcast, live courses, webinar, and transmission to remote sites (25,27-30)

Those are activities with purposeful planning, spreading everywhere and probably in excess. Those are also available on line, with a rainbow of new formats. Live courses have also changed toward demonstrations utilizing animal preparations or the simulcast format providing a simplest and safest expert's opinions and advices, with video recorded cases and presented without editing.

The life sensation is almost the same, the interaction with the expert on site and not performing at the same time the difficult procedure, and the possibility of reviewing a higher number of cases and to repeat the interesting moments is to be highlighted.

Courses transmitted to remote sites are also spreading, permitting interactions at lower costs, and without the necessity of local presence, avoiding in some cases the travelling difficulties. They could come directly to your personal mobile phone, everywhere.

Small group sessions

It is the usual format to teach to a limited number of trainees. It could be as an open discussion or a close discussion format with moderators promoting the interaction and trainees participation.

Several didactic skills and techniques could be utilized, such as "role playing", "aquarius" or "video analysis" for instance.

Technical skills could be learned in a stepwise fashion. The Endoscopy Ultrasound requires the endoscopy and the ultrasound skills at the same time, with a long period of formation and a longer learning curve.

The practical process of positioning the endoscope in the esophagus first, then the pylorus and duodenum, as well as the rectum and colon, has to be step by step. Then to get clear images and understand their meaning, and to be in concordance with the monitor. Then fine needle aspiration and biopsies and later on, local treatment beyond the intestine wall, such as neurolysis.

The animal-lab work with standardized models is an expanding teaching format, that permits again, the practice of old or new procedures getting expertise and shortening the learning curve, avoiding complications in the real patient practice.

The restrictions for the hands on practice has become more and more difficult, because of the patient informed consents required for utilizing the teaching material created during their medical approach for diagnosis and treatment, for observing the procedures or practicing somehow in the required procedures under expert supervision.

Training Centers (31-33,35)

Those are the real actual "teaching aid", for learning or upgrading the expertise in endoscopy, as long as those centers have a team of trainers used to handle the trainees' difficulties and the best quality control indexes, which are the goals for the new experts.

Usually those centers of excellence do facilitate all the mentioned teaching aids, as a part of the scholar armamentarium.

The expert endoscopist and not only the trainee should besides persist in practice, to maintain his/her skills (CME). As permanent improvement, for the adoption, for instance, of new technology or new applications (magnification, tattooing, NBI, FICE or NOTES).

Technological improvement implies better storage and data transmission associated to exponential increments in the velocity and therefore an increment of the possibilities of endoscopy information technology and communication, at a lower cost.

Adult education principles

Adult education differs clearly of scholar or university ones, but it also have similarities.

Motivation is the very first clue to success, the necessity to answer clinical questions, to manage patients in the daily work, to get new skills or new requisites for credentialing. Requiring advanced weapons to serve those objectives.

Recognized education motors are the following:

- a) Understand learning as a mean to get an end. It has to be focused in objectives.
- b) The outcome you seek should be explained, known and agreed with the trainees.
- c) The Purposes and benefits should be also clear, to get the involvement of all the actors in these processes.

- d) The use of real life conditions and problems and not only theoretical scenarios is desirable.
- e) To understand that the learning is actual and necessary for the present and not only for the future applications.
- f) Frequently the necessities to accomplish requisites to get an academic degree, a specialty or even institutional privileges or Continuing Medical Education.
- g) To learn a new skill, or new applications and it means also better economical conditions.

Education should also be objectives based, considering planning, execution and evaluation of the plan. The experience and enthusiasm of the trainers is to be also considered.

They have experiences to bring to the learning sessions, not only in the topics they are tackling but also in teaching armamentarium. They have a real impression of the outcomes obtained in similar situations or even due to their experience, new essays of teaching/learning inter phases could come to the arena

They prefer to be consulted and not preached to. The access to the trainer is preferable open and availability is a plus.

In the training process there is a need to see progress. To realize how important the new knowledge has been to their daily work and how they are able to perform and develop new skills. Progression in the right way, is also a motor.

The positive feed-back is desirable, and should be given in private and also at the precise moment. Frequent feed-back could be interesting in directioning the training if needed. It has to be intention oriented and with clear guidance to the objectives.

Feed-back has to be first hand, specific, related to the action and not to the person. Non judgmental, relevant and consistent.

They built their learning by problem solving, mimicking their usual future work. Doing so, the learning process, make sense and it is the usual way that medicine works.

Multiculturalism is a relatively new aspect to be considered, and the final outcome in knowledge and professionalism has been considered better.

The approach of trainers and trainees has its own dynamics. It is adequate to treat them equally and with respect. This approach has to be a cooperative one. The questions that test but at the same time bring, to discussion are an excellent alternative to be used. Do not forget that the trainer very often also learns from the trainee undoubtedly.

This approach uses manageable steps and requires as mentioned, frequent feed back and testing.

Understand the trainer labor as facilitator rather than lecturer, thinking always that adults cannot be forced to change their mind and of course persuasion is better.

Training frequently needs a stepwise advance, increasing progressively the intensity and difficulties of the knowledge, skills and practical performances.

Finally the training process is more successful if you make it fun. You transfer educational contents in an agreeable and pleasant atmosphere, avoiding stressful situations.

The assessment process should also be clearly planed in advance. Objectives, contents, instruments, timing, expected outcomes according to the results, have to be considered and known beforehand.

Learners are successful if: the learning interaction is purposeful, meaningful and relevant and becomes actively involved and reflective with the objectives clearly identified and giving as mentioned positive feedback, and not negative critiquing.

Factors influencing learning

It is stated that the most important factors influencing the learning process includes the subject matter, motivation, learner ability, teaching skill, resource quality, environmental constraints (time, workload, interest, financial, environment). Table 2.

Table 2. The learning pyramid.

Average retention rate	(%)
Lecture	5
Reading	10
Audiovisual	20
Demonstration	30
Discussion group	50
Practice by doing	75
Teach others	80

Lecture format

It is clear after the retention rate of the lecture format, that it could be changed, and recommended to other different formats which are more successful. Anyhow it is still frequently there in most scenarios.

Attention should be paid to the Setting in order to design the lecture itself. Consider the trainee present level of knowledge and what do you want them to learn. It is also interesting to establish linkages with trainee's previous knowledge and experience, controlling the environmental interferences.

Timing for the lectures has to be clearly stated, avoiding extended ones, privileging the dialogue during this activity. It is also desirable to break it down into separate parcels. The interest should be always on top of the list of objectives of the lectures. Eye contact permits the sensation of been involved. The use of questions and interaction as a form of feedback and a measuring of the understanding is recommended.

The closure is extremely important, establishing a clear take home message, take and answer questions before the end, persisting in the eye contact. A summary of the talk before coming to the end is supposed to be the rule and terminate.

Open discussion sessions

It is a better retention format compared to lectures, including an important amount of interaction. Questions and answers are positively accepted.

They are related to the group agenda, and reflected to an individual or group. Trainers could propose questions such as: What do you think?

The discussion should develop with different questions such as: What would follow from that? Questions are directed from one to another member of the session.

Positive critiquing

It is interesting to remember that, it is stated that adults do not accept negative criticism. The positive critique enhances the learning environment, with better outcomes.

According to the Pendleton rules, the questions to enhance the positive critiquing are as follows.

- What did you do well?
- What could be done better?
- What do you think he/she did well?
- What do you think he/she could be done better?

Models /phantoms ⁽³⁶⁻³⁹⁾

Those important aids to actual education are there and increasing their use. Computer, virtual reality and Model simulation use, (Colo EASIE- Erlangen, Simbionix GI Mentor, Accu Touch, etc). Some phantoms are sophisticated and expensive; others are available in convenient computerized formats. The outcome of their use is to get the learning curve shortened avoiding complications.

Models are becoming more and more popular, but mentoring and personal targeted tutorial training is essential and cannot be replaced.

The endoscopy expertise should be learned in a "step by step" basis. The different fragments of a difficult procedure should be reached in successive attempts.

Trainees

Clearly trainees are all different so the individual training process has to be differently designed and tailored to his attributes.

Trainee logbook records, specifying particular skills completed by the fellow & number of cases done without assistance, is essential for further assessment.

Take home message

In adult education, learning is best if motivated, objectives centered, interactive, practical. Do not forget to let them teach others. Use a stepwise format with positive critiquing and frequent feed back instances. New learning weapons, should be used and never forget to Make it FUN! ^(40,41)

REFERENCES

1. Wexner SD, Litwin D, Cohen J, Earle D, Ferzli G, Flaherty J, et al. [Principles of privileging and credentialing for endoscopy and colonoscopy](#). *Gastrointest Endosc.* 2002; 55(2):145-8.
2. [Principles of training in gastrointestinal endoscopy. From the ASGE. American Society for Gastrointestinal Endoscopy](#). *Gastrointest Endosc.* 1999; 49(6):845-53.
3. [Guidelines for credentialing and granting privileges for gastrointestinal endoscopy. American Society for Gastrointestinal Endoscopy](#). *Gastrointest Endosc.* 1998;48(6):679-82.
3. Grassini M, Verna C, Battaglia E, Niola P, Navino M, Bassotti G. [Education improves colonoscopy appropriateness](#). *Gastrointest Endosc.* 2008; 67(1):88-93.
4. Rex DK, Petrini JL, Baron TH, Chak A, Cohen J, Deal SE, et al. [Quality indicators for colonoscopy](#). *Am J Gastroenterol.* 2006; 101(4):873-85.
6. [Methods of granting hospital privileges to perform gastrointestinal endoscopy. American Society for Gastrointestinal Endoscopy Standards of Training and Practice Committee](#). *Gastrointest. Endosc.* 1992;38(6):765-7
5. Tassios PS, Ladas SD, Grammenos I, Demertzis K, Raptis SA. [Acquisition of competence in colonoscopy: the learning curve of trainees](#). *Endoscopy.* 1999; 31(9):702-6.
6. Cass OW. [Training to competence in gastrointestinal endoscopy: a plea for continuous measuring of objective end points](#). *Endoscopy.* 1999; 31:751-4.
7. Waye JD, Toouli J, Guelrud M, Kothari KC, Kotlík J, Nowak A, et al. [Who is permitted to do endoscopy?](#) *Gastrointest Endosc.* 2001; 53(2):267-9.
8. Joint Advisory Group on Gastrointestinal Endoscopy. Recommendations for Training in

- Gastrointestinal Endoscopy. London: British Society of Gastroenterology; 1999.
9. Qureshi WA, Zuckerman MJ, Adler DG, Davila RE, Egan JV, Gan SI, et al. [ASGE guideline: modifications in endoscopic practice for the elderly](#). *Gastrointest Endosc.* 2006; 63(4):566-9.
 10. Neumann M, Hochberger J, Felzmann T, Ell C, Hohenberger W. [Part 1. The Erlanger endotrainer](#). *Endoscopy.* 2001;33(10):887-90.
 11. Taylor I. [Can performance as an undergraduate assist entry selection into surgical training programmes?](#) *Ann R Coll Surg Engl.* 2005; 87(1):1-2.
 12. Raskin JB, Nord JN, eds. *Colonoscopy: principles and techniques*. New York: Igaku-Shoin; 1995.
 13. Baillie J. *Gastrointestinal endoscopy: beyond the basics*. Boston: Butterworth-Heinemann; 1997.
 14. Cotton PB, Williams CB. *Practical gastrointestinal endoscopy: 5th ed.* Oxford: Blackwell Publishing; 2003.
 15. Sivak MV Jr, ed. *Gastroenterologic endoscopy*. 2nd ed. Philadelphia: WB Saunders; 2000.
 16. Schiller KFR. *Atlas of gastrointestinal endoscopy and related pathology*. Oxford: Blackwell Science; 2002.
 17. Nagasako K, Fujimori T, Hoshihara Y, Tabuchi M. *Atlas of gastroenterologic endoscopy by high-resolution videoendoscope*. New York: Igaku-Shoin; 1998.
 18. Keeffe EB, Jeffrey RB, Lee RG. *Atlas of gastrointestinal endoscopy*. Philadelphia: Current Medicine; 1998.
 19. Maratka Z. Terminology, definitions and diagnostic criteria in digestive endoscopy. *OMED Database of Digestive Endoscopy*. Englewood: Normed Verlag; 1989.
 20. Dounavis P, Karistinou E, Diomidus M, Mantas J. Using World Wide Web technology for educating students in the health care sector. In: Pappas C, Maglaveria N, Scherrer JR, eds. *Medical Informatics Europe '97*. Amsterdam: IOS Press; 1997. p. 686-90.
 21. [Training the gastroenterologist of the future: the gastroenterology core curriculum. The Gastroenterology Leadership Council](#). *Gastroenterology.* 1996; 110(4):1266-300.
 21. Lemley B. [Internet 2: a supercharged new network with true telepresence puts the needs of science first](#). *Discover.* 2002;23(5):62-7.
 22. Wayne JD. [Continuing education in endoscopy: live courses or video format?](#) *Gastrointest Endosc.* 2000; 52(3):447-51.
 23. Hirsh DA, Ogur B, Thibault GE, Cox M. ["Continuity" as an organizing principle for clinical education reform](#). *N Engl J Med.* 2007; 356(8):858-66.
 24. Hochberger, Detlev M, Maiss J. ERCP Training. In: Baron T, Kozarek R, Carr-Locke D, Editors. *ERCP*. Saunders: Elsevier; 2008. p. 61-70.
 25. Cotton PB. [Live endoscopy demonstrations are great, but...](#) *Gastrointest Endosc.* 2000; 51(5):627-9.
 26. Carr-Locke DL, Gostout CJ, Van Dam J. [A guideline for live endoscopy courses: an ASGE white paper](#). *Gastrointest Endosc.* 2001; 53(6):685-8.
 27. Eisen GM, Dominitz JA, Faigel DO, Goldstein JL, Kalloo AN, Petersen BT, et al. [Guidelines for advanced endoscopic training](#). *Gastrointest Endosc.* 2001; 53(7):846-8.
 28. Marshall JB. [Technical proficiency of trainees performing colonoscopy: a learning curve](#). *Gastrointest Endosc.* 1995;42(5):287-91.
 29. Chak A, Cooper GS, Blades EW, Canto M, Sivak MV Jr. [Prospective assessment of colonic intubation skills in trainees](#). *Gastrointest Endosc.* 1996;44(1): 54-7.
 30. Wayne JD, Leicester RJ. [Teaching endoscopy in the new millennium](#). *Gastrointest Endosc.* 2001;54(5):671-3.
 31. Hochberger J, Maiss J, Magdeburg B, Cohen J, Hahn EG. [Training simulators and education in gastrointestinal endoscopy current status and perspectives in 2001](#). *Endoscopy.* 2001; 33(6):541-9.
 32. Wayne JD. [Teaching basic endoscopy](#). *Gastrointest Endosc.* 2000; 51(3):375-7.
 33. Bar-Meir S. [A new endoscopic simulator](#). *Endoscopy.* 2000; 32(11):898-900.
 34. Sedlack RE, Kolars JC. [Validation of a computer-based colonoscopy simulator](#). *Gastrointest Endosc.* 2003; 57(2):214-8.
 35. Hochberger J, Maiss J. [Currently available simulators: ex vivo models](#). *Gastrointest Endosc Clin N Am.* 2006; 16(3):435-49.
 36. Sedlack RE. [Validation of computer simulation training for esophagogastroduodenoscopy: pilot study](#). *J Gastroenterol Hepatol.* 2007;22(8):1214-9.
 37. Tajiri H. [Optimal endoscopic training system for gastrointestinal endoscopy: How shall we train gastrointestinal fellows effectively in near future?](#) *Gastroenterol Endosc.* 2004; 46(6):1153-9.
 38. Harewood GC, Petersen BT, Ott BJ. [Prospective assessment of the impact of feedback on colonoscopy performance](#). *Aliment Pharmacol Ther.* 2006; 24(2):313-8.
 39. Saenz R. Teaching aids in Colonoscopy. In: Wiley-Blackwell Ed. Wayne J, Rex D, Williams C. *Colonoscopy: Principles and practice*; 2009. Ch. 12.

Correspondence:

Roque Sáenz, MD

E-mail: rsaenz@alemana.cl