

The Development of an Electronic Portfolio for Postgraduate Surgical Training in Flanders

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Abstract. *Background* : Contemporary surgical postgraduate training is characterized by clear outcomes for the profession and an assessment program that shows that trainees master these outcomes. The tool used to collect assessment and feedback instruments is the portfolio, nowadays used in many countries worldwide.

Methods : The four Flemish surgical coordinators, together with experts from different universities, devised an electronic portfolio. This portfolio holds both the logbook, as imposed by the evaluation committee and assessment instruments used for the Master in Specialized Medicine.

Results : The e-portfolio is now used by a number of surgical trainees and has been approved by the evaluation committee. In 2015, all Flemish surgical trainees will be using one and the same e-portfolio.

Conclusion : Although the e-portfolio for surgical training has now been devised and accepted by all major parties involved, a lot of work has to be done to implement the instrument. As resident duty hours show no improvement on education in surgery (but rather a perception of worsened education) surgery training is facing huge challenges.

Abbreviations

WBA, Workplace Based Assessment
MSM, Master in Specialised Medicine
ECTS, European Credit Transfer System
Mini-CEX, Mini Clinical Examination
SWG, Surgery Working Group
OSATS, Objective Structured Assessment of Technical Skills
GOALS, Global Operative Assessment of Laparoscopic Skills

Introduction

Global postgraduate medical training and transition

Postgraduate medical training has been the subject of many changes over the last decades. There are several reasons that lead to these changes worldwide : there is a growing concern that trainees were seldom observed, assessed and given feedback (1) ; technical complexities have been growing ; the implementation of limited working hours has been installed in many countries (2) ; there is the need to ensure that all graduates are competent (3) etc.

Most changes in postgraduate medical training are characterized by the introduction of clear outcomes for the profession, hand in hand with an assessment program that aims to ensure that all graduates show that they obtained all outcomes by the end of their postgraduate training program. Trainees are assessed on a more continuous and frequent basis (formative assessment), using assessment tools that meet minimum standards of quality

and by qualitative approaches (4) such as narrative feedback. As research has demonstrated that medical students' scores on tests are not a predictor for actual day-to-day performance (5), workplace-based assessment (WBA) is chosen to find out how a doctor is actually performing on a daily basis. He/she must be assessed when engaged in normal work (6). The organisation and collection of all assessment and feedback is quite an undertaking job, for which the (educational) portfolio seems to be the most obvious tool.

Materials and Method

Until 2009, any postgraduate surgical trainee in Belgium had to quantify his/her training procedures and weekend calls in a logbook ('stageboekje') that had to be sent to the evaluation committee on a yearly basis. When the evaluation committee ('erkenningcommissie'), consisting of several university and non-university based official surgical trainers, considered the work done satisfying, the trainee was given a green light to continue his or her training or start the profession independently. A limited number of hours of 'academic training' (not specified) was compulsory in order to obtain the title of specialist at the end of the training program.

In 2009, the Master in Specialised Medicine (MSM) was introduced by the four medical faculties of Flanders offering academic postgraduate training (the Universities of Antwerp, Brussels, Ghent and Leuven). The focus of this academic program was on the **qualitative** evaluation

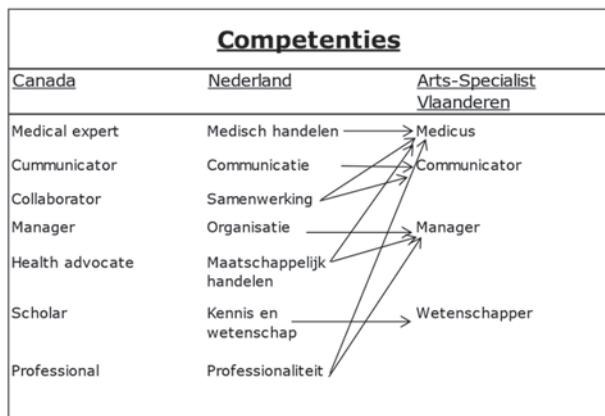


Figure 1. From 7 CanMEDS roles to the 4 roles in the Master in Specialised Medicine.

for the trainee, in addition to the quantitative evaluation provided by the logbook, keeping up with the global transitions in postgraduate education. The MSM is a global term for 30 specialties, all having their specific outcomes ; surgery is one of these 30.

The MSM was modelled after the CanMEDS framework. The CanMEDS Physician Competency Framework describes the knowledge, skills and abilities that specialist physicians need for better patient outcomes. The framework is based on the seven roles that all physicians need to have, to be able to perform as a good doctor : Medical Expert, Communicator, Collaborator, Manager, Health Advocate, Scholar, and Professional. For the MSM, the seven roles were integrated into four roles : Researcher, Medical Expert, Manager and Communicator. The role of Researcher placed emphasis on scientific research, which is part of the MSM.

In the initial model, comprised of 120 European Credit Transfer System points (ECTS) there were three levels. A level one with topics for all specialties (such as Evidence Based Medicine) and levels two and three, which were specialty oriented.

The content for the surgery based MSM program (96 ECTS) was designed by the university based ‘coordinating’ surgical trainers (one trainer per university). They defined the end competencies for the Flemish surgeon, based on international competencies and their own experience. The content of the remaining 24 ECTS was designed by the educational committee of each university and meant for all trainees from different specializations.

The evaluation of the MSM consisted of a general portfolio, designed by the interuniversity portfolio workgroup. This general portfolio consisted of an explanation on the use of the portfolio and a number of evaluation forms (e.g. for the 6 months evaluation meeting with the

local supervisor and the annual evaluation meeting with the coordinating supervisor, the mini-CEX form and a form for evaluation of scientific presentation. The use of this (paper) portfolio differed between specialisations and between universities. This meant that a surgical supervisor from an affiliated hospital, who had to assess surgical trainees from different universities, was confronted with different systems of evaluation and feedback.

In 2013, the four universities received a formal report from the official accreditation committee on the MSM and negative assessment was given to three of them. A revision of different aspects of the MSM was necessary, and the committee emphasised a transfer to an electronic portfolio. In their report, the committee suggested to design an *integrated* portfolio, comprising both the (quantitative) logbook and MSM related assessment instruments and other documents. The design, they stated, should be made within each specialisation and not as a general instrument that can be used for all specialisations.

The University of Antwerp started a pilot project with ePASS, a Dutch e-portfolio designed by the University of Maastricht and Mateum (www.mateum.nl) and with Medbook. Medbook is an e-portfolio originally designed by a Belgian urology trainee and Imengine (www.imengine.be), a Flemish company creating web based tools. For surgery, Medbook was chosen as the tool to pilot with.

In May 2013, all five coordinating surgical trainers (P. De Leyn, G. Delvaux, G. Hubens, P. Pattyn, X. Rogiers) from the four universities sat down with G. Peeraer (educational coordinator from UAntwerp), G. De Win (urologist and designer of the first Medbook prototype) and K. Verbert from Imengine. During the meetings of this surgery working group (SWG), the development and implementation of the Surgery e-portfolio was initiated.

The e-portfolio holds all necessary documents for trainees: the logbook, MSM feedback instruments, journal entries (activities), a progression report and a CV.

A. Logbook

In the original Medbook design the surgical logbook was ready for use, adding to its user-friendliness by designing an iPhone app as well as tools for documenting necessary information. No changes were made to the forms needed by the evaluation committee as not to interfere with their criteria for accreditation.

B. Formative assessment/feedback instruments

For the assessment, the SWG looked into formative assessment instruments : formative assessment aims at development by monitoring a trainee’s progress and giving structured feedback.

	A	S1	S2	Z	T	K+ONCO
1. Algemene heelkunde						
Excisie van oppervlakkig letsel	0	2	1	1	0	0
Klierbiopsie	0	1	2	0	0	0
Drainage abces	0	0	1	0	0	0
Orgaanprelevatie	0	1	0	0	0	0
Orgaantransplantatie	1	0	0	0	0	0
Totals:	2	4	4	1	0	0
2. Heelkundige spoedgevallen						
- Unknown procedure	2	0	1	0	0	0
Totals:	2	0	1	0	0	0
3. Intensieve zorgen						
Venasectie	0	0	1	0	0	0
Fijne neeldbiopsie	0	0	1	0	0	0
- Unknown procedure	0	0	0	1	0	0
Totals:	0	0	2	1	0	0
4. Abdominale heelkunde						
Hernie	0	0	0	0	0	0
Liesbreuk open	0	0	5	0	0	0
Liesbreuk laparoscopisch	0	1	1	0	0	0
Navelbreuk	0	0	1	0	0	0
Littekenbreuk, met prothese	0	1	1	0	0	0
Slokdarm	0	0	0	0	0	0

Figure 2. Medbook screenshot : Logbook.

1. Global Rating Scales during surgery : OSATS/GOALS

Global rating scales are used to rate more general skills, applicable to all surgical procedures. These scales consist of generic components of operative skill that are marked on a Likert Scale, with the middle and the extreme points anchored by explicit descriptors to help in the criterion referenced assessment of performance. The Objective Structured Assessment of Technical Skills (OSATS) was one of the first methods designed for objective skills assessment (7). Performance during the performance of tasks is assessed by using checklists specific to the opera-

tion or task and a global rating scale. This scale consists of seven generic components of surgical skill : Respect for tissue, Time and Motion, Instrument Handling, Knowledge of instruments, Use of assistants, Flow of operation and forward planning and knowledge of the specific procedure. Originally it was designed for use in laboratory settings, but it is now also used in the operating theatre. VAN HOVE identified seven studies about the use of OSATS in the real theatre setting and all showed construct validity (8). REGEHR later showed that when using both checklists and a global rating scale, checklists

do not add any additional value to the assessment process and that their reliability is lower than that for the global rating scale (9).

GOALS is a similar global rating scale but specific to laparoscopy (10). It is also composed of five items which are marked on a visual analog scale (VAS) for the difficulty of the surgery and a likert scale (perception of depth, bimanual dexterity, efficiency, measurement of fluidity and the progression of the procedure), tissue handling and autonomy). This approach was originally applied to the dissection phase of laparoscopic cholecystectomy. The construct validity of GOALS was not only established on total score but also on each of the five GOALS items. It appears to be highly reliable. The predictive and concurrent validity of the GOALS was established and it was proven that it could be used for video assessment and is applicable to the total laparoscopic cholecystectomy and other procedures (11, 12, 13). The only drawback to this kind of assessments are the resources and time involved in getting experienced surgeons to observe the performance of trainees.

In Medbook, the rating scales are linked to the logbook : if a trainee performs a procedure, he/she can ask the supervisor to use the rating scales for that same procedure. This way, a trainee can both quantify his/her procedures but also show the expertise with which they performed the procedure. This feedback is elementary for the learning process.

2. Assessing the core competencies at the bedside : the mini-Clinical Examination (Korte Klinische Begeleiding)

The mini-Clinical Examination (mini-CEX) is a spin-off of the traditional Clinical Examination, an assessment that took many hours and during which the trainee had to solve a patient problem involving a real life patient. This often high stakes examination assesses the trainee on only one case and is quite time-consuming. The mini-CEX on the other hand takes less time and can be used on a number of bedside moments, in a greater variety of clinical settings with a much more diverse set of patient problems. The difficulty of the examination will vary with the patient a trainee encounters during the mini-CEX (14).

During the mini-CEX an experienced clinician/clinical teacher observes the trainee during a patient contact. The trainee is scored on :

- interviewing skills
- physical examination
- professionalism
- clinical judgment
- counselling
- organization
- communication with patient

Add OSATS Open procedure ← Back to procedure

Procedure

Location: Antwerpen, UZA
 Year of training: 3rd year of training
 Date: 21-10-2014
 Procedure: Kinderchirurgie - Laparotomie
 Concerning cancer: No
 Task of the assistant: [Progress indicator]
 Comments: *

Supervisor*: Hubens, Guy * required field
 Complexity*: LOW MEDIUM HIGH

Criteria

Criterion	1	2	3	4	5
Tissue feeling *	<input type="radio"/> Often uses unnecessary force and causes tissue damage through the improper use of instruments.	<input type="radio"/>	<input type="radio"/> Proceeds carefully with the tissue, reciprocal tissue damage.	<input checked="" type="radio"/>	<input type="radio"/> Consistently careful treatment of tissue with minimal tissue damage.
Time and movement *	<input type="radio"/> Inefficient. Frequent unnecessary movements.	<input type="radio"/>	<input type="radio"/> Reasonably efficient movements, some unnecessary movements persist.	<input type="radio"/>	<input type="radio"/> Appropriate movements, maximum efficiency.
Knowledge and use of instruments. *	<input type="radio"/> Repeatedly clumsy and causes improper use of instruments.	<input type="radio"/>	<input type="radio"/> Sometimes still clumsy, usually right choice and proper use of instruments.	<input type="radio"/>	<input type="radio"/> Flowing movements and report use of the right instruments.
Use of assistance *	<input type="radio"/> Very little instruction in assistance and insufficient use thereof.	<input type="radio"/>	<input type="radio"/> Uses assistance properly most of the time.	<input type="radio"/>	<input type="radio"/> Uses assistance strategically, in optimal fashion.
Progress of operation *	<input type="radio"/> Starts operating frequently, often asks for instructions.	<input type="radio"/>	<input type="radio"/> Demonstrates forward planning, steady progress of operation.	<input type="radio"/>	<input type="radio"/> Clear planning of operation, effortless transition from one step to the next.
Procedure's knowledge *	<input type="radio"/> Insufficient knowledge, needs specific instructions almost in every subsequent step.	<input type="radio"/>	<input type="radio"/> Knows the most important aspects of the operation.	<input type="radio"/>	<input type="radio"/> Demonstrates an extensive degree of knowledge of the entire operation.
Peroperative care *	<input type="radio"/> Disorderly and impulsive.	<input type="radio"/>	<input type="radio"/> Performs well, but interventions are needed.	<input type="radio"/>	<input type="radio"/> Independent, meticulous and complete.

Satisfaction about this assessment

Satisfaction of assessor: very goodgood

Satisfaction of assistant: very goodgood

Remarks by assistant

Feedback by supervisor

Digital signature supervisor

Link current OSATS/GOALS to the following folders to complete them automatically

OSATS

Save or Cancel

Disclaimer - Need help? E-mail helpdesk@medbook.be

Figure 3. Medbook screenshot : OSATS.

Without interrupting, the observer scores the trainee on one or several items mentioned above. The observation is followed by a short feedback moment between observer and trainee, leading to a written comprehensive (narrative) reflection. This reflection includes strengths, weaknesses, hints/tips for improvement in future practice and possible follow-up. This feedback is a necessity for the trainee to learn.

Although the mini-CEX is not the ‘ultimate gold standard’ to rely upon, it does ensure that different clinicians observe a reasonable sample of the trainee’s clinical skills over time (14). Furthermore, identification of a performance gap is possible only if standard performance is known and actual performance is observed.

In the e-portfolio, both OSATS/GOALS and mini-CEX can be filled out immediately (through any computer or tablet) by the observer. He/she has a login and can access the forms, fills in the trainees’ name and the file is immediately sent to the trainee’s portfolio after completion. It is also possible to login with the trainee’s name, fill out the form and validate the form with a special validation code (only given to supervisors). A third option is to login to the form with a trainee’s login and have the form sent to the supervisor. He/she can validate the form at a later moment, in the supervisor’s e-portfolio. We will come back to the supervisor’s e-portfolio later.

3. Official feedback moments : functioning and global assessment

Although most clinicians are familiar with the principles of feedback, the general complaint from students and trainees is ‘I never receive any feedback’. There are reasons : actual lack of feedback, but also trainees’ not realising that they have been given feedback (15). In order to remedy this shortcoming, regular ‘feedback moments’ with clinical supervisor are organised. During these conversations trainee and supervisor discuss the trainees’ knowledge, skills and attitudes during the previous working period and focus on the next period : how to address weaknesses, how to obtain the necessary knowledge and skills etc. The documentation of these conversations is summarized in a written report and signed by both trainee and clinical supervisor.

4. Giving feedback on presentations : research and case reports

In order to help supervisors in giving useful feedback when trainees present or report on research and patient cases, two comprehensive forms were implemented in Medbook. The forms were not new, but previously used on paper by both graduate and some postgraduate supervisors.

The screenshot shows the 'Add mini CEX' form in the Medbook system. The form is divided into several sections:

- Form Fields:** Date (02-12-2014), Location (Antwerpen, Dr. Walter Franssen), Practice supervisor (Franssen, Marc), Case (Complex), Consultation type (FIRST CONTACT), Degree of difficulty (LOW), Focus (Diagnose), and Attachments (Add attachment).
- Clinical questions:** A list of questions with 'not applicable' status: Registration (CE), Medical case history, K.O., Help offer, Communication, Clinical judgement, Professionalism, Organising, and General.
- What was remarkably good?:** A large text input area.
- Suggestions for improvement:** A large text input area.
- Agreed action points:** A large text input area.
- Satisfaction about this assessment:** Two radio button options: Satisfaction of assessor and Satisfaction of assistant.
- Digital signature supervisor:** A text input area for the supervisor's signature.
- Buttons:** A green 'Save' button and a 'Cancel' button.

Figure 4. Medbook screenshot : mini-CEX.

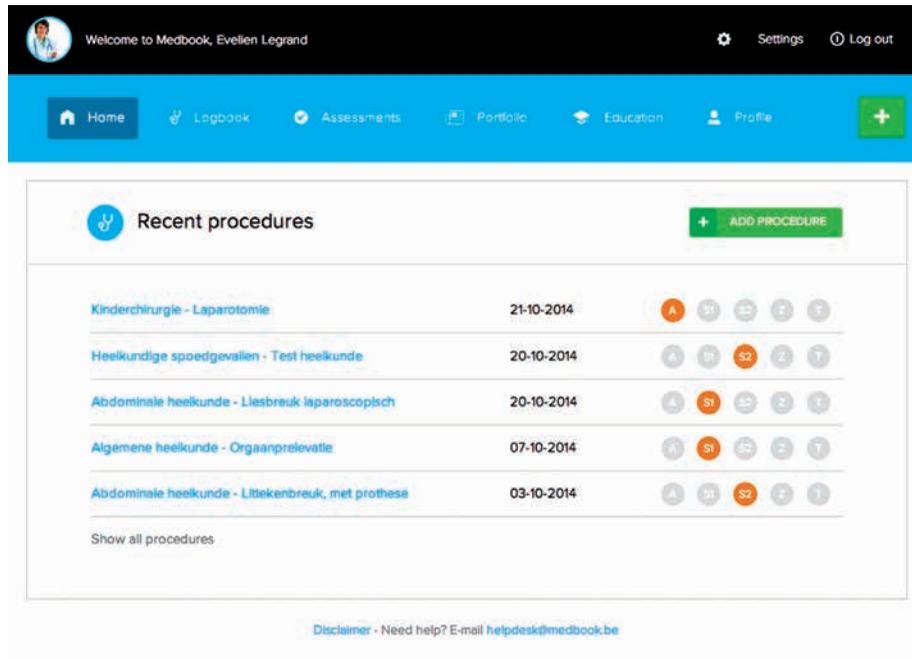


Figure 5. Medbook screenshot : trainees homepage when logged in.

C. Journal entries (formal activities relating to surgical training)

During postgraduate training, a trainee has to take courses, goes to journal clubs and conferences etc. The third part of Medbook is the ‘Journal’ in which trainees list their own formal activities with a very easy tool :

- (local) courses and meetings
- conferences
- publications
- certificates
- additional documents

All of this can be automatically transferred to a CV.

D. MSG program progression, Training Plan and official outcomes

In order to see his/her progression of obtained outcomes, Medbook implemented a visual progression page. This page also holds the official training plan (as signed by coordinating supervisor and sent to the FOD) and the official MSM outcomes for surgical training.

E. CV

A number of Medbook entries can be ‘sent’ to the CV, which is the final part of this e-portfolio. This CV can be mailed to third parties and adjusted at any time.

The content of the e-portfolio for surgery, as illustrated above, is what trainees see when they log in to the system. Each trainee has his/her own personal login.

Each coordinating supervisor, as well as the supervi-

sor who is responsible for training at a peripheral hospital (named on the official training plan) have access to all documents in a trainee’s portfolio. When they log in, they see the list of names of trainees they are supervising. A coordinating supervisor has access during the entire postgraduate training, a peripheral supervisor has access during the period he/she is responsible for the training of the trainee.

There is also a third ‘category’ : trainees are also given feedback by other members of staff (medical doctors in this case) who are not the official supervisor. These members of staff give valuable feedback and therefore they are given partial login to Medbook : they can access feedback instruments (OSATS, mini-CEX,...) but they can’t see the logbook, feedback reports or other entries.

Results

Although most of the work in ‘filling out’ the e-portfolio is done by the trainee, all supervisors play an important role in the project. They are the ones giving feedback and therefore have to validate different forms. Coordinating and peripheral supervisors have to monitor the progress of their trainees. The e-portfolio offers them the opportunity to see all activities filled out by the trainees : achievements, as well as strengths and weaknesses are documented in an easy accessible manor, which gives more possibilities for thoroughly looking at the training the trainee is going through.

Until now, a number of freshman trainees have been using the e-portfolio as a pilot. The evaluation is taking

place by means of a survey, coordinated by the coordinating surgical supervisors. These supervisors have also shown the e-portfolio to the evaluation committee. Although they used to be in favour of receiving only the logbook, they now approved of the e-portfolio and its WBA instruments. This means that all Flemish trainers and trainees will be using one and the same e-portfolio from 2015.

Discussion

If all of us want to contribute to licensing competent surgeons, who are able to work in the health care of the future, the e-portfolio is a step in that direction. Due to the restriction of Resident Duty Hours to 48/60hours per week, surgical training is facing huge challenges: a recent review has shown that duty hour changes are not associated with improvements in resident well-being and have negative impacts on patient outcomes and performance on certification examinations (16). Through the e-portfolio supervisors are able to keep track with trainees progress instead of worrying about the short time trainees spend in OR.

Although assessment instruments keep track of trainees' learning curves, it takes time to adapt to this new way of (documenting) learning. Although most of the instruments are used worldwide, research shows negative feedback by users (17, 18) e.g. the growing on-line bureaucratic burden that demoralises busy surgical trainers and trainees. It is not easy to refute the assertion that WBA assessments lead nowhere: the changes in practice, due to the use of feedback through WBA instruments, are extremely difficult to measure due to confounding factors and problems with study designs (19). This lack of convincing validity may also hamper the use of the Flemish e-portfolio, as users have to be convinced of its usefulness. As long as they are viewed as 'thick-box' exercises rather than an educational tool, they offer no benefit for training (20).

The fundamental change in surgical education has been a shift away from a traditional apprenticeship to structured training with associated assessment instruments. Although some of the old apprenticeship models have to be kept in surgical training, the environment in which contemporary training is taking place has dramatically changed compared to two or three decades ago. A surgical training program that does not adapt to these changes is therefore outmoded and useless. There is no evidence that a "time-spent" model, with the same number of years of training for everyone, is the best model (21) but most supervisors and trainees prefer this model. Despite the assumption that trainees do perform enough cases to become competent surgeons, recent studies have shown that surgical residents report significantly less exposure to some surgical procedures than

supervisors believe might be required (22). There is therefore a need for a higher level of accountability and sensitive assessment instruments for technical, nontechnical and higher-order skills (such as decision making) are needed (23).

The Flemish e-portfolio for surgical training is a tool that –when used correctly– detects lack in competencies and therefore helps trainees and supervisors getting a clear view on training progression.

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