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Preparing the Formative and Summative evaluation

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Executive Summary

As progress in medicine becomes faster, the necessity to up-date professional knowledge is increasing, as well as demands for a better anticipation of skill needs and labour-market. The sectorial fragmentation and the weak comparability and recognition of qualifications gained by doctors throughout Europe have a negative impact on their mobility, competitiveness and potential employability. Different qualifications systems discourage continuous training in other countries and limit the mobility of doctors. Due to the above sectorial fragmentation, low level of investments, international co-operations and exchanges of good practices limits the development of the sector. Despite eHealth has been proved effective in reducing market fragmentation through benchmarking, standardization and certification, low investments and weak public-private cooperation still inhibit the integration of technological innovation.

According to this framework, The Millennium Hospital e-Learning (MHeL) project fosters synergies between professional associations, training providers, certification bodies and ICT developers. In Italy, the aim is to adapt the CME in minimal invasive surgery, innovations, quality standards and solutions developed in 2 eHealth European best practices.

This document describes the structure of the system testing, formative and summative evaluation of the MHeL Platform using the two identified e-courses:

- E-learning course on Colposcopy and cervical-vaginal diseases;
- E-Learning course on Hysterectomy.

The summative evaluation will be based is based on Kirkpatrick's model for summative evaluations of learning experiences.

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1 Introduction

The objective of this WP is to test and evaluate the e-courses as provide trough the MHeL platform-the virtual environment (see also: Blended learning modules for minimally invasive surgery accredited for the delivery of CME/ECM for the pilot transfer - R8).

We distinguish the following types of evaluations (see chapter 2):

1. System Testing
2. Formative Evaluation
3. Summative evaluation

During the System testing and Formative Evaluation we will be obtain information about issues / weaknesses in the MHeL platform and e-courses and improve them until it reaches sufficient quality. The phases are detailed described in chapter 2 of this document.

As a next step we will perform small scale evaluations with summative aspects at the application partner site (SEGI) to improve the leaners experience first impression of its impact to deliver CME/ECM results.

Finally we will perform, during pilots, larger scale summative evaluation to gain a clear and solid evidence of the impact of reflective learning trough the MHeL Platform using the two identified e-courses:

- E-learning course on Colposcopy and cervical-vaginal diseases
- E-Learning course on Hysterectomy

Moving through the above mentioned three stages in sequence provides the pilot test users with a better holistic user experience, avoids frustrating users and will more likely lead to better overall project results.

The summative evaluation will be is based on Kirkpatrick's model for summative evaluations learning experiences (as also used successful during the MIRROR project) and is described in chapter 3 of this document.

Further we will develop a toolbox to support the summative evaluations. The structure of the toolbox is describes in chapter 4.

This document

2 Evaluation planning

The main goal of the System Testing and Formative Evaluation is to improve the MHeL platform and e-courses. Testing techniques are used to provide qualitative feedback which is then used to guide the software development for possible improvements. The Summative Evaluation is performed to gain a clear and solid evidence of the impact of the platform and selected e-courses.

2.1 System Testing

During system testing the system will be tested, by representatives of the project partners, to verify if it meets the specified requirements. Both functional and non-functional tests will be carried out.

System testing will have three components:

- Functional tests: based on functional test cases;
- Integration tests: based on scenario test cases;
- Performance testing.

The test results will be reported in the MHeL Issue Tracking System (MIT). This enables the logging of the test activities and transparent tracking of defects / opportunities for improvement discovered during the specific test.

2.2 Formative evaluation Pilot

A small number of physicians, selected by SEGI, will use the system in the context of a short pilot test. They will be provided with a set of tasks and learning assignments to be performed.

Doing the first pilot test with assigned representatives of the users will help create a more mature and robust system. This also protects the target users by avoiding frustrating them unnecessarily with a badly functioning system.

The test activities will be carried out based on a script containing the actions to be carried out and recorded. At the end of the test we will ask them to fill in the user evaluation questionnaire. The test script and questionnaire will be part of the Evaluation Toolkit.

2.3 Summative evaluation Pilot

When both the MHeL System and the e-courses have reached good maturity is time to move to large scales of use. The goal is no longer to optimize, but to measure the impact of the learning experience. For this a larger number of users is needed to reach statistical reliability.

There will be three main operational phases.

Phase 1: the formation of a group of medical specialists chosen to evaluate the MHeL to be educated by using the MHeL system. Experts from the project partners will provide guidance during this evaluation. Issues will be recorded and discussed with the experts. Where applicable improvements will be made.

Phase 2: The individuals who have applied for acquisition of skills of microsurgery will be informed in advance of the possibility to participate in the evaluation. SEGI will ask volunteers / experts to conduct the full course on Hysterectomy. Besides that we will ask

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them to do some specific takes and record the results. At the end we will ask them to fill in a questionnaire about the usability and perceived added value.

The participants need to attend the pilot courses in the MHeL platform both through conference room experiments, and through the distance learning platform.

The course participants will also be asked to evaluate the quality of the e-course/s (as indicated in "Regolamento applicativo dei criteri oggettivi di cui all'Accordo Stato-Regioni del 5 Novembre 2009 e per l'accreditamento" approved by the CNFC on 13 January 2010).

Note:

The summative evaluation by the aforementioned physicians, will be held according to the Italian regulations for accreditation. Participants will be tested for their knowledge on a multiple choice exam (as described in "Criteri per l'assegnazione dei crediti alle attività ECM" of 13 January 2010, page 15, note 2, and "Regolamento applicativo dei criteri oggettivi di cui all'Accordo Stato-Regioni del 5 Novembre 2009 e per l'accreditamento approvato dalla Commissione Nazionale per la Formazione Continua" of 13 January 2010, page 25, note 7).

All those who pass the examination with at least 75% correct responses will receive a certificate of attendance that indicates the number of credits acquired (as regulated by the Accordo Stato-Regioni of 19 April 2012 and its attachment 1 "Linee Guida per i manuali di accreditamento dei provider nazionali e regionali/province autonome").

If a course participant fails a test, he or she can retry another four times on similar tests in which the order of the questions and their possible answers have been varied.

Phase 3: Obtain accreditation of MHeL. MHeL will be accredited both within Italy and at the European level. MHeL users will so get a double certification supplying both Italian and European recognized credits. MHeL will be firstly addressed to a cohort of at least 10-20 physicians who belong to the three Italian Medical Associations involved in the project, and later on to a larger group of users up to 1.000 or 2.000 physicians. This launch will testify to the success of the development of MHeL. The partners in MHeL will adhere to Italian and European regulations for accreditation and testing.

3 Evaluation model

In line with the levels of evaluation developed by Kirkpatrick, we will consider the first three levels of summative evaluation. Because MHeL supports serious game based learning (rather than Kirkpatrick's formal learning) we have modified these levels slightly, as described below.

Level 1: Reaction

To what degree do participants react favourably to MHeL approach of learning?

Reactions to instances of the learning are measured. Because MHeL is focussing on games based, informal learning, Level 1 additionally includes whether participants are motivated to use the MHeL platform. This can be measured by recording when and how this is used (i.e., with log files). In addition, we can evaluate the user experience through subjective evaluations. There is much overlap with formative evaluation regarding this level, but in the summative evaluation we focus more on usage as a precondition for the next levels.

Level 2: Learning

To what degree do participants acquire knowledge, skills, attitudes, confidence, and commitment?

Level 2 is concerned with what users learn, and how that learning is aligned with what we intend for them to learn. Learning can be assessed by specific evaluation forms that ask for documentation of learning outcomes or subjective ratings. Quantity and quality of these learning outcomes can then be examined.

Level 3: Behaviour

To what degree do participants apply what they learn?

Assuming learning has occurred, and that the work environment is conducive, it is now possible to measure the conversion rate of behavioural intentions into actions. Level 3 is concerned with whether the new knowledge and skills are put to use. We will measure using questionnaires to be answered by the learners some weeks after the conclusion of the learning experience.

4 Evaluation Toolkit structure

Based on the specification of the summative evaluation criteria, we will create a toolkit to support the evaluation.

The toolkit will be created based on specific questions suitable for writing questionnaires. However, these questions can easily be modified to be used in interviews and focus groups.

The questions are organized according to the three Kirkpatrick levels.

4.1 Demographic Information

Some data about the participants is necessary to connect the participant data across different tests of the MHeL platform.

Participant ID: The Participant ID consists of the first three letters of the participant's place of birth, and the first two letters of the participant's day of birth.

Test-ID: This is the ID of the specific test or evaluation carried out.

Test Date: (dd-mm-yyyy)

Gender: (1 = Male, 2 = Female), might not be allowed in all testbeds

Age: (range: 1 = ≤19, 2 = 20-29, 3 = 30-39, 4 = 40-49, 5 = 50-59, 6 = ≥60)

Position: Position of the participant in his organisation.

4.2 Level 1: Reaction (Usage)

Although usability is firmly an issue of formative evaluation, usage is a precondition for any higher level in the evaluation model. Thus, we are concerned about the actual usage numbers and qualities.

Log files will be used that provide simplified logging of the desired data. If this is not possible, we will provide questions that can be asked regarding the usage of MHeL.

The following logfile data will be used: Number of times used; Total time (minutes) used; Average time (minutes) used.

The following self-report questions will be used when the log file data in the MHeL system is not available (because of connection issues etc.)

How many times have you used the system?

- How many minutes did you spend using the platform in total?
- How many minutes did you spend using the platform on average?
- How many times did you use a specific function of the platform?

4.3 Level 2: Learning

4.3.1 Short Reflection Scale

The Short Reflection Scale, as developed during the MIRROR project, assesses participant's general tendency to reflect during work / learning experience and the importance they place on reflection. This will give us information whether reflection activities have been increased during / after the learning experience.

- I often reflect on my work in order to improve it.
- We as a team often reflect on our work in order to improve it.
- I think it is important to try to improve my professional capabilities/ related to my work.
- In team meetings we frequently talk about how we can improve.
- Outside of meetings, I often talk with my colleagues about my work.
- It is important to me to discuss frequently with others about my work.
- Conversations with colleagues help me to improve my work.

4.3.2 Learning outcomes

On the outcome level of reflection (learning), we ask the two mandatory subjective questions below.

- I made a conscious decision about how to behave in the future.
- I gained a deeper understanding of my work life.

Further we will monitor the results of the final test and the scores on the reflection question after each course module.

4.4 Level 3: Behaviour

4.4.1 Subjective improvement in work

To keep the amount of questions as short as possible, we only ask participants a single item regarding the behaviour level as a core question. This core question assesses the central aspect: Did the work behaviour improve?

- MHeL helped me to improve my work performance.

In addition we will ask some questions about the potential future usage of the MHeL platform and additional e-courses:

- I see the long-term advantage of using MHeL in my work-life.
- I would like to use MHeL continuously as part of my work-life.
- It is practical for me to continue using MHeL in my work-life.

5 Outlook

During the first months of Y2 of the project, the toolkit will be created.

When the first version of the MHeL platform is available System Testing will be carried out for about 3-4 weeks. This will include the resolution of issues.

As a next step the Formative Evaluation will be carried out. This is planned for a period of 2-3 weeks.

Finally the Summative Evaluation will be done. This will cover a period of 3 months.

When all tests are satisfactory, we will evaluate the test results and questionnaires and decide on future enhancements where needed, in order to prepare the e-learning platform to become operational for a larger group of learners.

We document the available test results in a report that will form the basis for the deliverable.