



# Healthcare Interoperability Testing and Conformance Harmonisation

WP3: Testing Process and Evaluation

D3.2 Evaluation results of the test plans implemented  
during real events



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Project number:	FP7-ICT-2009-4
Project name:	HITCH. Healthcare Interoperability Testing and Conformance Harmonisation
Document id:	D3.2 Evaluation results of the test plans implemented during real events
Document name:	HITCH-D3.2-Evaluation-V1.00.docx
Dissemination level*	PU: Public
Version:	1.0
Date:	29.05.2011
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\*Dissemination level: PU = Public, PP = Restricted to other programme participants, RE = Restricted to a group specified by the consortium, CO = Confidential, only for members of the consortium.

ABSTRACT
<p>The objective of deliverable D3.2 is to evaluate the generic Quality Management System (QMS) for Interoperability Testing that was developed in HITCH WP1. An instance of the Quality Management System for Interoperability Testing specific for the IHE Connectathon has been developed and documented in HITCH deliverable D3.1</p> <p>When an organization decides to implement new systems, it can perform a "change readiness examination" to measure the possible resistance towards the new system.</p> <p>The "change readiness examination" includes a questionnaire survey which is followed up by a focus group interview by a small group of the respondents.</p> <p>The overall objective is to get as much as feedbacks on these real tests to improve the quality of the IHE Connectathon interoperability testing and thus the overall approach to solve interoperability.</p>
KEYWORDS
<p>Quality management system, interoperability testing, patient identification, change readiness, , evaluation, roadmap.</p>

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# 1 INTRODUCTION

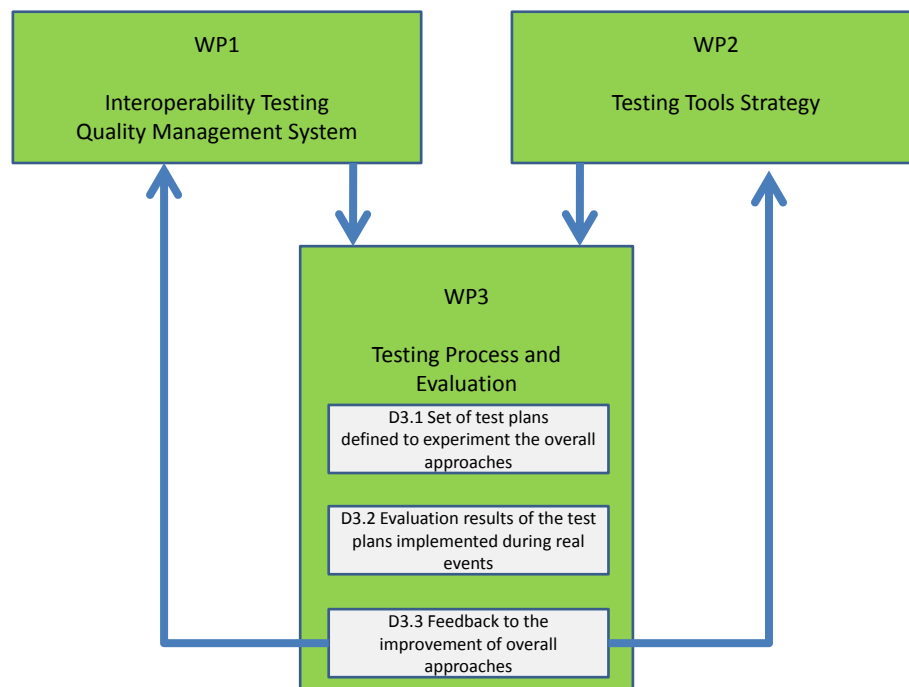
## 1.1 Objective of the HITCH project

The aim of the HITCH (Healthcare Interoperability Testing and Conformance Harmonisation) project is to involve major stakeholders being already at the heart of Interoperability issues for defining and agreeing on a roadmap to establish a foundation for the Interoperability Conformance Testing of information systems in the field of Healthcare.

The project will evaluate existing approaches and propose an achievable Interoperability Conformance Testing foundation deployable starting in 2011. Potential gaps in existing initiatives will be identified, as well as evolutions that should be undertaken over the next five years. The roadmap will thereby identify specific needs in terms of process improvements and tools development along with supporting research.

## 1.2 Objective of the evaluation

The objective of deliverable D3.2 is to evaluate the generic Quality Management System (QMS) for Interoperability Testing that was developed in HITCH WP1.



**Figure 1 - The different components in the evaluation**

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An instance of the Quality Management System for Interoperability Testing specific for the IHE Connectathon has been developed and documented in HITCH deliverable D3.1 [4].

It is a challenge to evaluate a Quality Management System as it a continuous process for an organization and it takes several years before substantial feedback can be obtained. The implementation of a Quality Management System can be improved by presenting the idea and concept to a group of people in the organization, which will be affected by the changes.

When an organization decides to implement a new system, it can perform a "change readiness examination" to measure the possible resistance towards the new system. The "change readiness examination" is based on sound methodology and is a tool for managers to gain knowledge about concerns that a group of persons may have in the organizations regarding planned changes.

Thus, a "change readiness examination" is a good methodology to assess the resistance in IHE about implementing the Quality Management System for Interoperability Testing for running a Connectathon.

The result of the performed "change readiness examination" is documented in this deliverable including a conclusion, which will be a valuable instrument for the IHE management level.

The "change readiness examination" includes a survey which is followed up by a focus group interview by a small group of the respondents.

Since the IHE Connectathon monitors will be mostly affected by the decision to implement and use a Quality Management System for Interoperability Testing, it was decided to ask all the monitors to fill out the questionnaire.

It is important to mention, that the questionnaire is not intended to be analyzed in dept. The objective is to generate fast knowledge of reasons that generate a resistance to changes in an organisation when implementing a new system (e.g. a Quality Management System for Interoperability Testing).

### 1.3 Reading guide

The evaluation described in this document is structured as follows:

Chapter 3 is a general introduction to change resistance that may occur when an organisation introduces new technologies or systems.

In chapter 4, a model to examine change readiness in an organisation is described. The chapter also includes the development of a questionnaire

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to examine the change readiness of IHE monitors regarding the introduction of an Interoperability Testing Quality Management System.

Chapter 5 describes the way to carry out the designed change readiness examination including a mini-QMS workshop and a focus group interview.

Chapter 6 shows the questionnaire and the analysis of its responses is presented in chapter 7.

In chapter 8, an overview of the performed mini workshop and focus interview is presented.

In chapter 9 the overall conclusions are given.

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## 2 REFERENCES

- [1] NM Lorenzi and RT Riley, Managing Change: an Overview, *Journal of American Medical Information Association*, 2000, 7(2): pages 116-24
- [2] Leavitt, H. J. (1965). Applying Organizational Change in Industry: Structural, Technological, and Humanistic Approaches. In *Handbook of Organizations*, edited by James G. March. Chicago: Rand McNally
- [3] Likert, R. (1932). A Technique for the Measurement of Attitudes, *Archives of Psychology*, No.140
- [4] European FP7 Project HITCH Deliverable D3.1: Set of test plans defined to experiment the overall approaches (2011)



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### 3 RESISTANCE TO CHANGE

Today's technological evolution happens with such a speed that an organization must continuously improve, enlarge or renew its processes to ensure meeting the expectations. This implies that the persons working for an organization must continuously be prepared for changes. The persons must be prepared to adopt new working procedures, acquire new competencies and accept changes in their personal status.

Dependent on the level of the change, the management of the implementation process and the individual persons' stress-level, the changes will influence the persons in the organization differently.

Accept	Enthusiastic cooperation and support Cooperation Cooperation via push from the management Accept
Indifferent	Passive resignation Apathetic (lost interest for the work) Does only what he/she is told to do
Passive resistance	Immature behaviour Missing learning
Active resistance	Object Work in accordance to the regulations Does as little as possible Destroy, deliberate sabotage

**Table 1 - Different types of behaviour in a situation of change**

Many managers have realized that implementing new processes will result in problems in terms of resistance from parts of the employees. This can be expressed by missing commitment or direct aversion, bad mood or in worst case that a person quit his job in the organization.

The different forms for resistance are understandable, as they express uncertainty regarding how the change will affect the individual work. The resistance can be expressed in many different ways, as shown in Table 1.

If a person is confident in his/her position, the reaction on the change will probably be in the upper part of the table, whereas a person, who feels his/her position threatened and as such unsure regarding the changes, will react as described below in the table.

That a part of the organization is reacting with resistance against changes cannot be justified by human reactions against changes in general. The resistance can be very well grounded. Below are examples on aversion to changes:

- 
- Loss of control and influence
  - New surprises forever (no preparation or information)
  - Great uncertainty (missing information)
  - Confused (too much change at the same time)
  - Loss of status (feel as a stupid regarding the new)
  - Unsure regarding own competencies
  - More work (changes requires more energy, time, meetings)

The resistance in the organization as a whole can vary a lot in intensity – from minimal to catastrophic. The resistance can also vary from person to person and depend on how the individual person is feeling with regard to the examples mentioned above.

The degree – or the intensity – of the resistance is of course a very important factor to clarify, before the management level can decide the needed steps to handle this resistance.

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## 4 MODEL OF CHANGE READINESS

A change readiness model can be used as a planning tool, to be used in planning and managing a process of change. Through the use of a change readiness model, the organisation clarifies already in the planning phase, what are the different aspects to be managed.

A number of existing change readiness models exists, e.g.:

- Lorenzi & Rileys model [1]
- Leavitt's system model [2]
- The analytic/rational model
- The process model

The models can be used isolated or combined and the choice of change model may depend on the concrete situation.

### 4.1 Model of change readiness

Besides the above mentioned change models, a number of models have also been developed to handle possible resistance to changes.

Lorenzi & Riley's have developed a model of change readiness. The model is developed as a tool to examine the change readiness – before implementing a new IT system in an organisation (e.g. an Electronic Health Record System in a Hospital).

The knowledge of reasons that generate a resistance to changes in an organisation can be used to minimise unwanted reactions and the follow-up on negative behaviour towards the new system.

Implementing a Quality Management System in an organisation will also face possible challenges with respect of the acceptance. Thus, the model of change readiness can be used before the implementation of a Quality Management System for the IHE Europe Connectathon, to examine possible reasons which can lead to resistance to changes.

Lorenzi & Riley have worked out a questionnaire that forms a readiness quiz. The questionnaire includes 17 questions, where the respondents can give a score from 1 to 3 to each question. The total score will indicate the challenges and the difficulties an organisation can expect in introducing and implementing a change in the organisation. The questions have been developed such that a high score indicates likely easy introduction of a change and a low score means that it is almost impossible to implement a new system without substantial resistance.

The result of the questionnaire will provide an organisation with a rough picture of the attitude towards the planned change based on relatively

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few questions. However it is important to notice that many different combinations of responses can result in the same score. The result of such an examination, which is presented by one single figure, must be taken with reserve.

## 4.2 Development of a model of change readiness for IHE QMS

Implementing a QMS is a challenge and there is a great need to consider the changes regarding the organisational nature, e.g. changes in workflow and competencies. Experiences show that the changes start already before the QMS is implemented and continues for a long time.

### 4.2.1 Definition of change readiness

A persons change readiness in relation to the implementation of a QMS for interoperability testing, is the persons will, interest and ability to enter into the change processes.

### 4.2.2 Objective for the change readiness examination

The objective is to develop a methodology to examine the change readiness as a tool that can be used to point out the most prominent attitudes towards implementing a new QMS for interoperability testing.

The results of the examination will give the organisation (IHE Europe) the possibility to perform targeted efforts towards specific areas that are regarded as problematic by some persons in the organisation.

### 4.2.3 Development methodology

#### *Selection of scale*

As mentioned previously, a sum of scores must be taken with reserve. Instead of using a numeric scale, the Likert-scale [3] is selected.

The Likert-scale is a psychometric scale commonly used in questionnaires and is the most widely used scale in survey research. When responding to a Likert questionnaire item, respondents specify their level of agreement to a statement.

#### *Construction of statement/response*

To achieve valid response, a number of rules need to be applied to construct statements using a Likert-scale. The statements must be:

- Unambiguous
- One-dimensional

- 
- Non-leading
  - Short
  - Precise
  - Understandable

The single response possibilities must be:

- Exhaustive
- Mutually excluding
- Adequately fine-grained
- Relevant

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A QMS will improve important areas in my work?

- I fully agree
- I partially agree
- I neither agree or disagree
- I partially disagree
- I fully disagree
- I don't know

---

**Table 2 - Statement and possible responses**

A Likert-scale must include at least two possible responses, e. q. agree/not agree. However it is recommended to use four or more response possibilities. It is important to ensure a good balance in the response possibilities, e.g. "agree" may be balanced by "disagree".

It is the choice of the author of the questionnaire to insert a neutral response possibility "neither agree nor disagree". The author must also decide whether to include the response possibility "don't know". Among researchers there are disagreements for using this option as it can be used to skip the question. On the other hand it gives the respondent the possibility to answer, if he/she doesn't know anything about the statement.

Experience shows that it is important to express the statements such that the response possibility "agree" shifts between a positive value and a negative value in relation to the statement. Table 3 shows an example of statements that are formulated differently, so the response possibilities are respectively positive and negative.

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A QMS will improve important areas in my work?

- I fully agree
- I partially agree
- I neither agree or disagree
- I partially disagree
- I fully disagree
- I don't know

A QMS will reduce important areas in my work?

- I fully agree
  - I partially agree
  - I neither agree or disagree
  - I partially disagree
  - I fully disagree
  - I don't know
- 

**Table 3 - Same statements in two ways - will shift the values for response**

The reason to shift the values for response is recommended as it will improve the "response-bias" (response-errors). In some cases the responders automatically put the marks, without thinking of the content of the questions. When the response possibilities shift, the responders are forced to think of the individual statement.

*Advantages of using a questionnaire*

The advantage of using a questionnaire is that you can get an overview of different aspects from a group of persons quickly and with reasonably few resources.

All the persons get the same questions and the same information before the examination and the response is thus not influenced by the persons in charge of implementing the Quality Management System.

The respondents can fill out the questionnaire when most convenient for them.

The methodology is good to get an overview of a problem, but does not provide detailed information. It is therefore a prerequisite that the questionnaire is enlarged with interviews, where it is possible to "dig in depth" into the problems that are revealed.

4.2.4 The HITCH QMS questionnaire for change readiness

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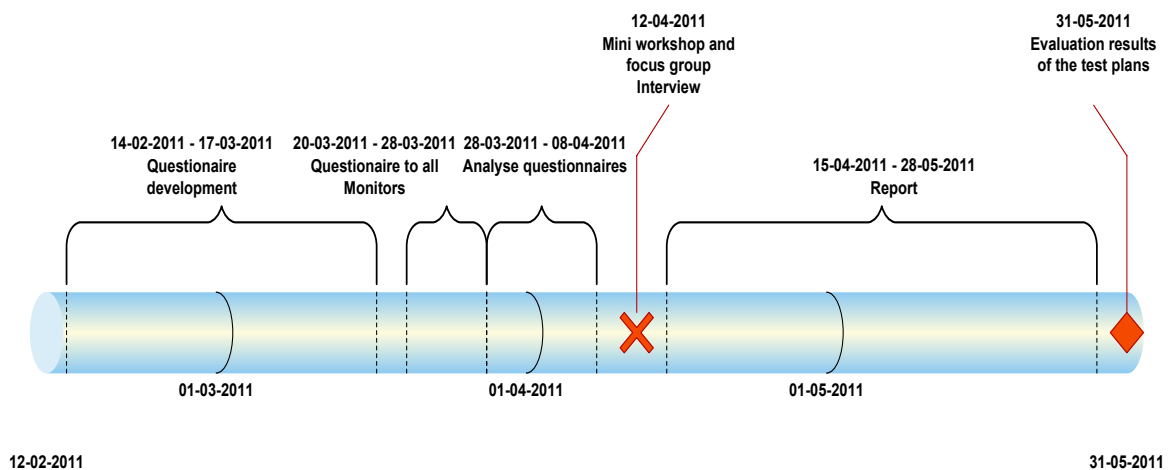
The HITCH QMS questionnaire to examine the change readiness includes 17 questions and is divided into four categories:

1. Basic information about the respondent
2. The person's knowledge of IHE Connectathon
3. The person's knowledge of Quality Management
4. The persons view on the needed changes when implementing a QMS for interoperability testing
5. The person's attitude to participate in the needed changes when implementing a QMS for interoperability testing
6. The person's confidence that IHE can manage to implement a QMS system

The questionnaire is shown in chapter 6.

## 5 HOW TO CARRY OUT A CHANGE READINESS EXAMINATION

Below is a description and time schedule for the change readiness examination for implementing a Quality Management System for Interoperability Testing.



**Figure 2 – Time schedule for change readiness examination**

### 5.1 Questionnaire development

The questionnaire has been developed as described in chapter 2 and 4 and by formulating questions in relation of implementing a Quality Management System.

The prerequisite for the questionnaire is that none of the monitors has been introduced beforehand by IHE to the current work about a Quality Management System for interoperability testing. However some of the monitors may have general knowledge about Quality Management.

### 5.2 Questionnaire to monitors

The persons involved in an IHE Connectathon can be divided into the following three groups:

- Managers
- Monitors
- Vendors

Since the monitors are a large group and will be affected by the decision to implement and use a Quality Management System for interoperability testing, it was decided to ask all monitors to fill out the questionnaire.



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The IHE Connectathon monitors are a relative large group (approximately 40 persons), which will be directly involved in the implementation of a Quality Management System for interoperability testing. It is therefore of utmost importance that this group is informed and included in the implementation process. The change readiness examination is the first step in this direction.

The questionnaire was filled by the monitors via a web-enabled interface using [www.defgo.net](http://www.defgo.net).

A letter with an invitation and introduction to the current work in HITCH was sent by email to the monitors.

### 5.3 Analysis of the questionnaires

The results of the questionnaires are analysed in terms of frequency of the individual questions as well as cross tabulation of response categories.

The preliminary result will be discussed in the focus group interview, with selected monitors (see below).

### 5.4 QMS mini-workshop and focus group interviews

A small group of 5 persons monitors was invited to participate in a mini-QMS workshop. The inclusion criteria was selected to cover the both non-experienced and experienced monitors.

The workshop was held during the IHE Connectathon. At the workshop the Quality Management System for interoperability testing as developed in HITCH was presented.

Before the workshop took place, the responses from the questionnaire were analysed in order to identify areas to be further elaborated and discussed.

The focus group interview was seen as a reasonable way for this elaboration as the participants may consider other views and can complement better with their own view than if the interview was held individually.

The objective of the focus group interview was to collect information about how to apply the recommendation regarding

1. A Quality Management System
2. Future Tools

in the context of improving the quality of interoperability testing at IHE Connectathon.

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Experiences from the focus group interview show that the interview should give room for other areas than those that are directly planned by the organizers. It turned out that these further topics brought up by the participants can also be very valuable for the organisation.

The focus group interview was recorded as audio (with authorisation of the attendees) since that way it is much easier to analyse afterwards, what was said during the interview.

The information from the focus group interview, together with the result of the questionnaire, will be further analysed and documented in deliverable D3.3: Feedback to the improvement of overall approaches described in WP1 (QMS) and WP2 (tools strategy).

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## 6 HITCH QMS QUESTIONNAIRE FOR CHANGE READINESS

### 6.1 Basic information

Your basic education:

- Computer scientist
- Engineer
- Health professional
- Humanistic
- Other: \_\_\_\_\_

You are:

- Male
- Female

Year for finalising your basic education:                      Year: \_\_\_\_\_

Year for your start as IHE monitor:                      Year: \_\_\_\_\_

Number of times you have been monitor, including 2011:                      Number: \_\_\_\_\_

What is your experience in IHE Connectathon Interoperability testing:

- Advanced
- Good
- Average
- Beginner
- None

### 6.2 Knowledge regarding IHE Connectathon

The following questions aims to examine your knowledge and how well you are informed regarding IHE Connectathon interoperability testing.

**Q1:** I am fully informed on how the tasks are assigned to the monitors?

- I fully agree
- I partially agree
- I neither agree or disagree
- I fully disagree

**Q2:** Do you know if IHE is having objectives and goals for the Connectathon Interoperability Testing?

- Yes
- No
- I don't know

---

**Q3:** Which of the following describes best your opinion regarding the webinar IHE are organising for the monitors?

- Excellent – it is focussed and very useful
- Well – but it can be improved
- Not useful at all
- I don't know

**Q4:** Which of the following describes best your opinion regarding the professional communication between the monitors?

- The communication is in the domain where I have my expertise
- The communication is spreading across many domains
- There is no communication
- I don't know

**Q5:** The individual monitor has a high degree of influence to decide which domain they will test?

- I fully agree
- I partially agree
- I neither agree or disagree
- I fully disagree
- I don't know

## 6.3 Knowledge regarding Quality Management

The questions in this section aim to examine your knowledge regarding Quality Management.

**Q6:** What describes best your knowledge to Quality Management?

- I am have great experience
- I have some knowledge
- I have no knowledge

**Q7:** A Quality Management System will improve the quality of the interoperability testing. Which of the following describes best your opinion?

- I fully agree
- I partially agree
- I neither agree or disagree
- I fully disagree
- I don't know

**Q8:** A Quality Management System will improve the collaboration between the monitors, vendors and stakeholders. Which of the following describes best your opinion?

- 
- I fully agree
  - I partially agree
  - I neither agree or disagree
  - I fully disagree
  - I don't know

## 6.4 The need for changes

The aim for the questions in this section is to examine, to what degree you think there is a need for changes in IHE in relation to implementing a Quality Management System.

**Q9:** Implementing a Quality Management System will not impose large changes in the organisational structure for IHE. Which of the following describes best your opinion?

- I fully agree
- I partially agree
- I neither agree or disagree
- I fully disagree
- I don't know

**Q10:** Implementing a Quality Management System will impose large changes in the interoperability testing procedures. Which of the following describes best your opinion?

- I fully agree
- I partially agree
- I neither agree or disagree
- I fully disagree
- I don't know

## 6.5 Readiness for changes

The aim for the questions in this section is to examine, your readiness to be involved in the changes in relation to implementing a Quality Management System in IHE.

**Q11:** A Quality Management System is a fundamental tool to ensure the future existence of IHE Connectathon interoperability testing. Which of the following describes best your opinion?

- 
- I fully agree
  - I partially agree
  - I neither agree or disagree
  - I fully disagree
  - I don't know

**Q12:** A Quality Management System will improve significant areas in my work as monitor. Which of the following describes best your opinion?

- I fully agree
- I partially agree
- I neither agree or disagree
- I fully disagree
- I don't know

**Q13:** A Quality Management System will not threaten any of my professional competencies. Which of the following describes best your opinion?

- I fully agree
- I partially agree
- I neither agree or disagree
- I fully disagree
- I don't know

## 6.6 Handling of changes

The aim for the questions in this section is to examine, weather you trust that IHE have the needed resources and competencies to implement a Quality Management System.

**Q14:** I am confident that IHE will support me with the needed education and information so I active can take part in the Quality Management. Which of the following describes best your opinion?

- I fully agree
- I partially agree
- I neither agree or disagree
- I fully disagree
- I don't know

**Q15:** Your colleagues in IHE are positive and will participate active in the implementation and use of a Quality Management System. Which of the following describes best your opinion?

- 
- I fully agree
  - I partially agree
  - I neither agree or disagree
  - I fully disagree
  - I don't know

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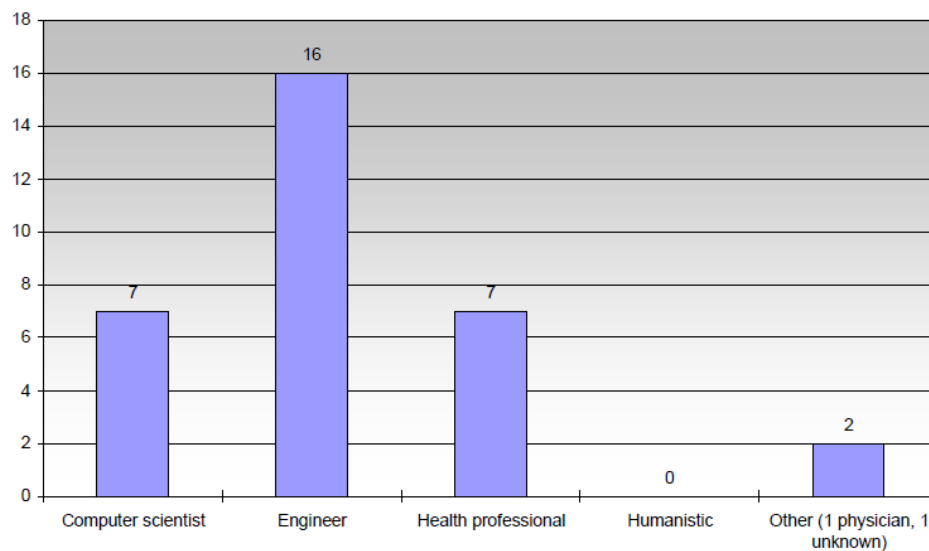
## 7 ANALYSIS OF THE QUESTIONNAIRE ANSWERS

The questionnaire was not sent to the monitors which also are partners in HITCH and thus already have information regarding the planned Quality Management System.

The questionnaire was sent to 34 monitors whereas 32 responded. This high response rate (94%) indicates a high degree of interest for the selected topic.

### 7.1 Basic information

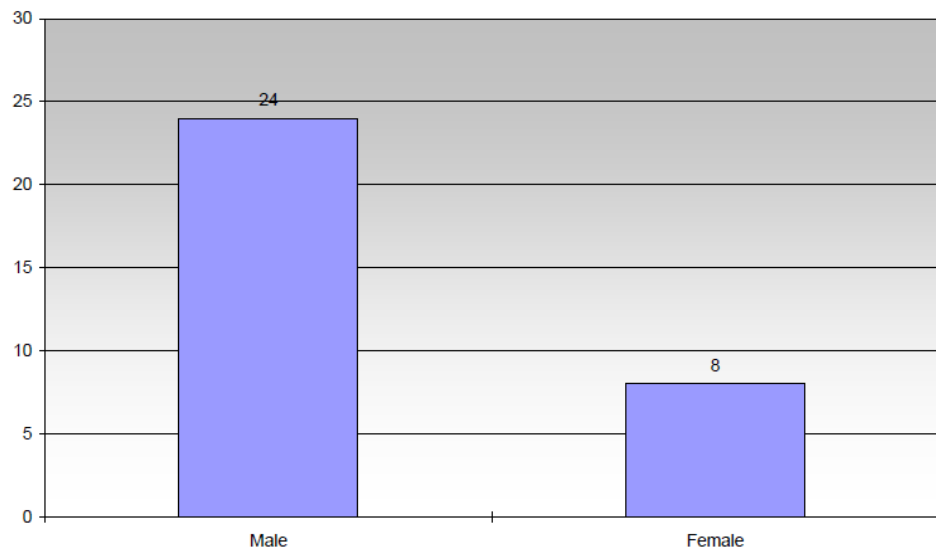
#### 7.1.1 1: Your basic education



The majority of the monitors have an education as engineers or computer scientists.

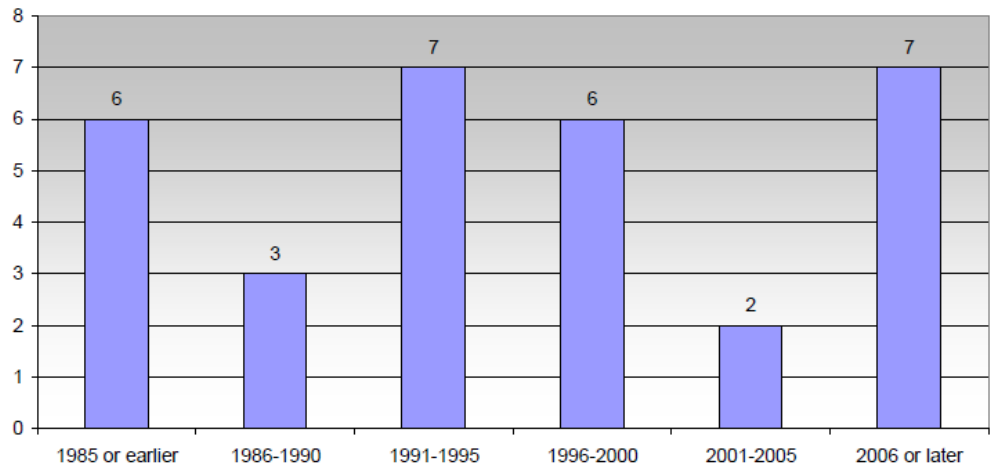
#### 7.1.2 2: You are





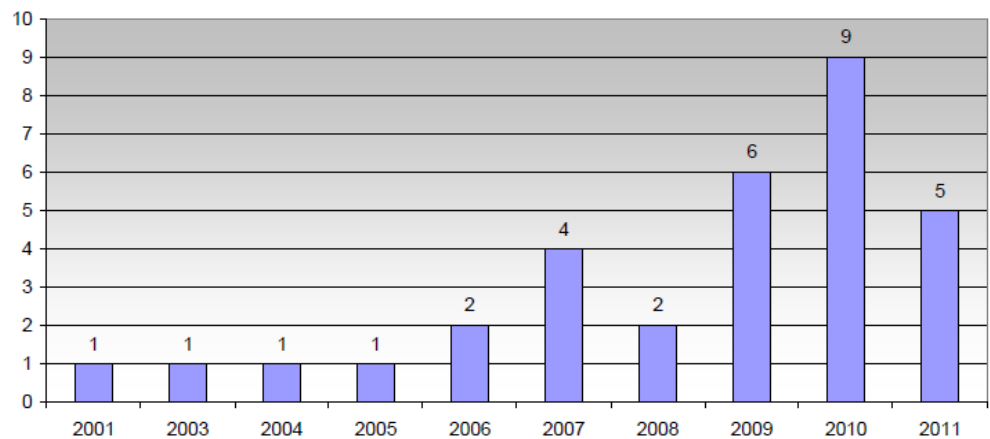
The majority of the monitors are male (75%).

### 7.1.3 3: Year of finalising your basic education



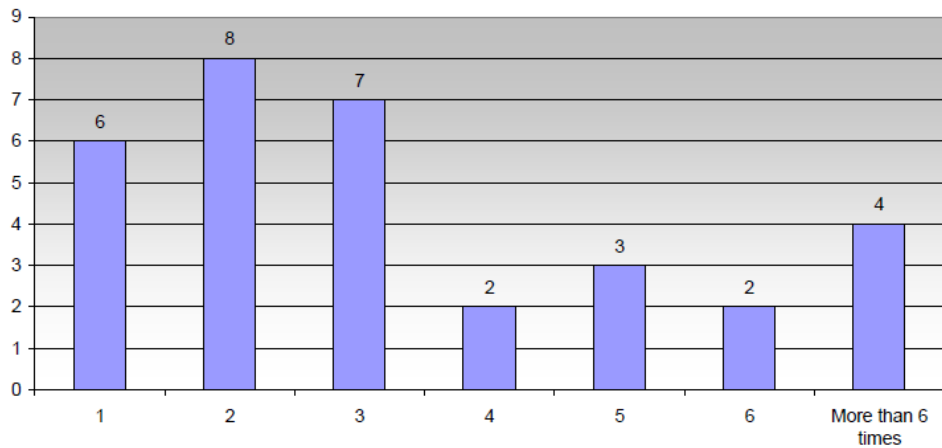
The year of finalizing the basic education for the monitors is spread equally over the past 25 years.

### 7.1.4 4: Year of your start as IHE monitor



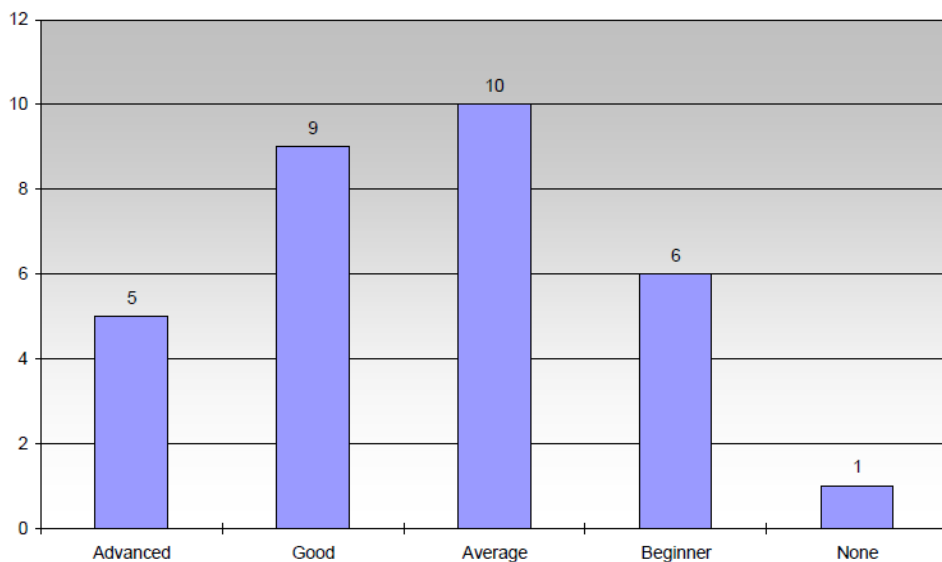
There are relatively many "young" monitors (1-3 year as monitors).

### 7.1.5 5: Number of times you have been monitor, including 2011



Relatively many have worked as monitor only a few times (1-3 times).

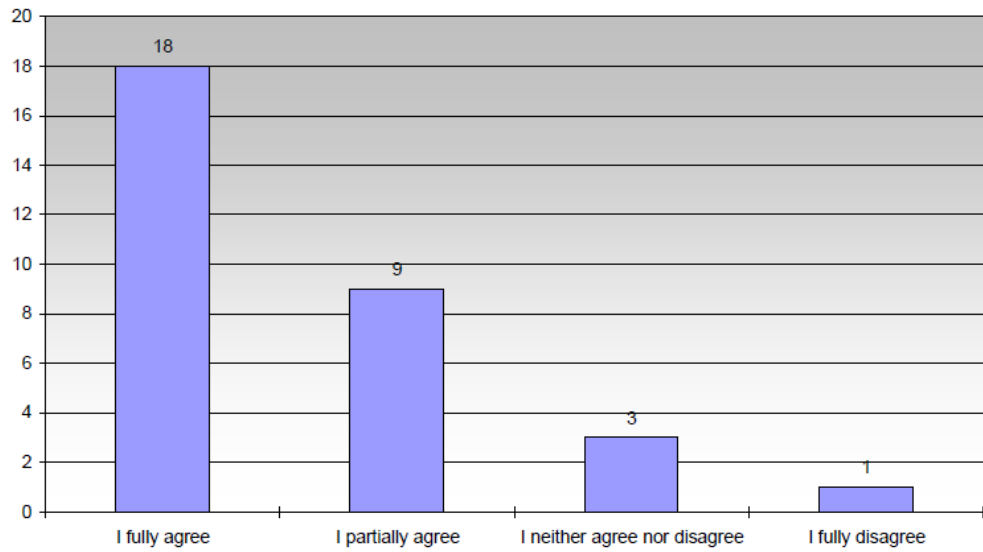
### 7.1.6 6: What is your level of experience in IHE Connectathon Interoperability Testing?



There are more beginners than advanced monitors.

## 7.2 Knowledge regarding IHE Connectathon

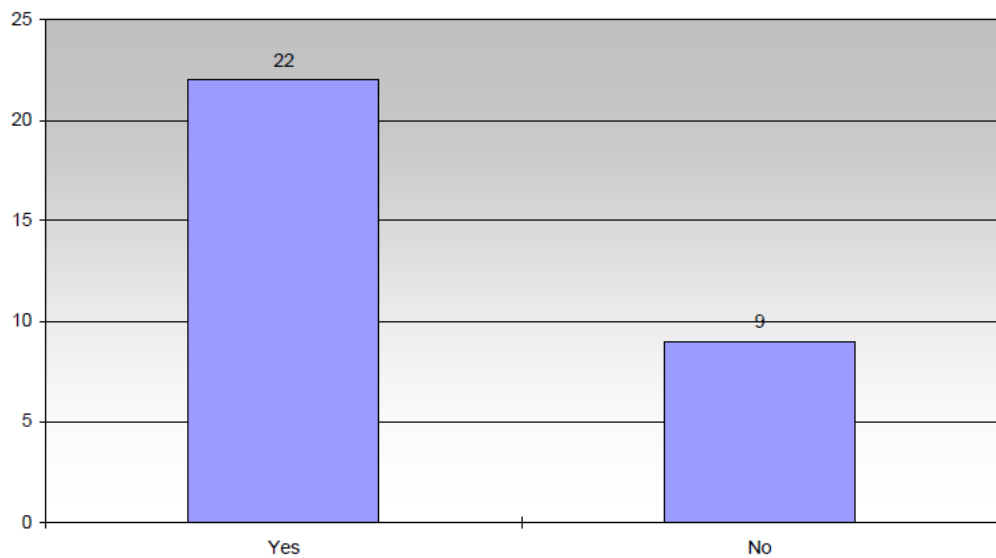
### 7.2.1 7: How do you agree with the statement: "I am fully informed on how the tasks are assigned to the Monitors"?



The majority of the monitors are fully informed on how the tasks are assigned during the Connectathon.

### 7.2.2

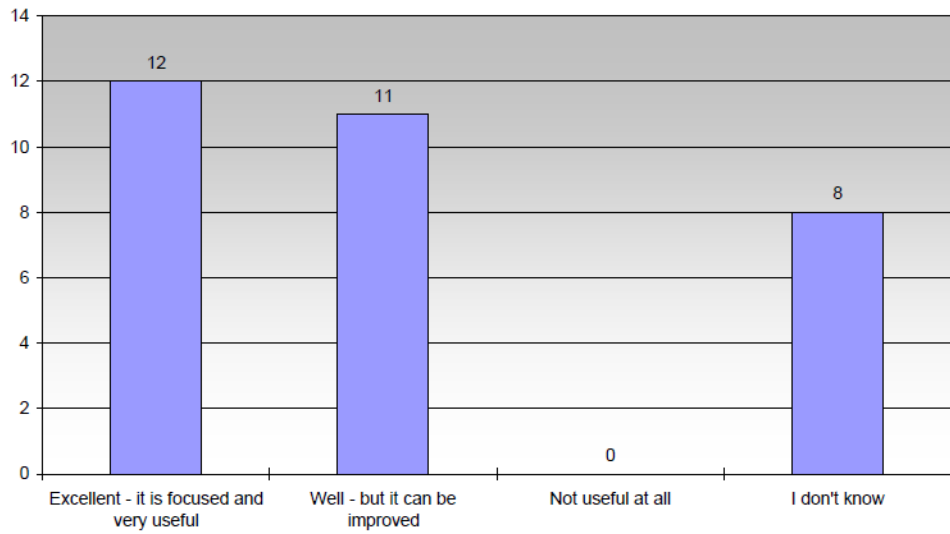
8: Do you know if IHE is having objectives and goals for the Connectathon Interoperability Testing?



The majority of the monitors have replied that they know that there are objectives and goals for the IHE Connectathon.

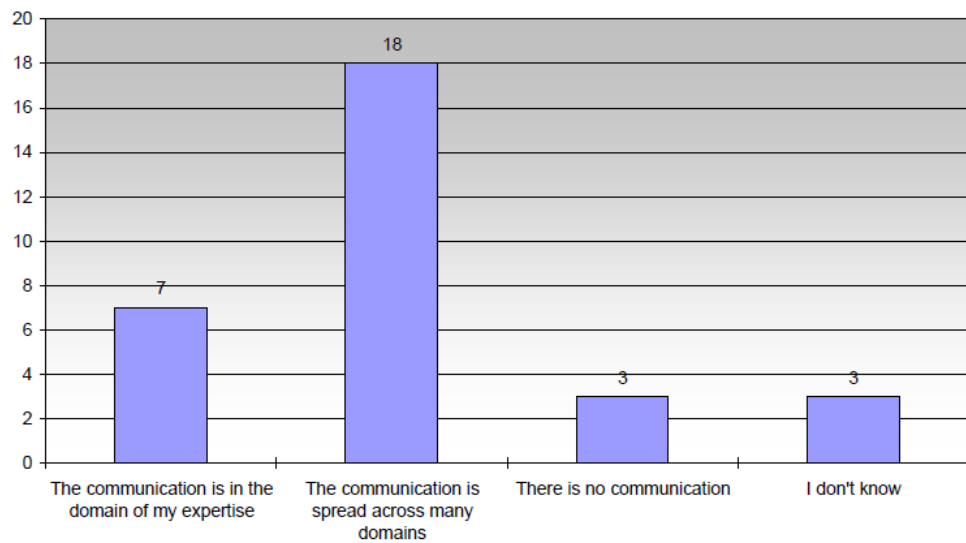
### 7.2.3

9: Which of the following best describes your opinion regarding the webinar IHE is organising for the Monitors?



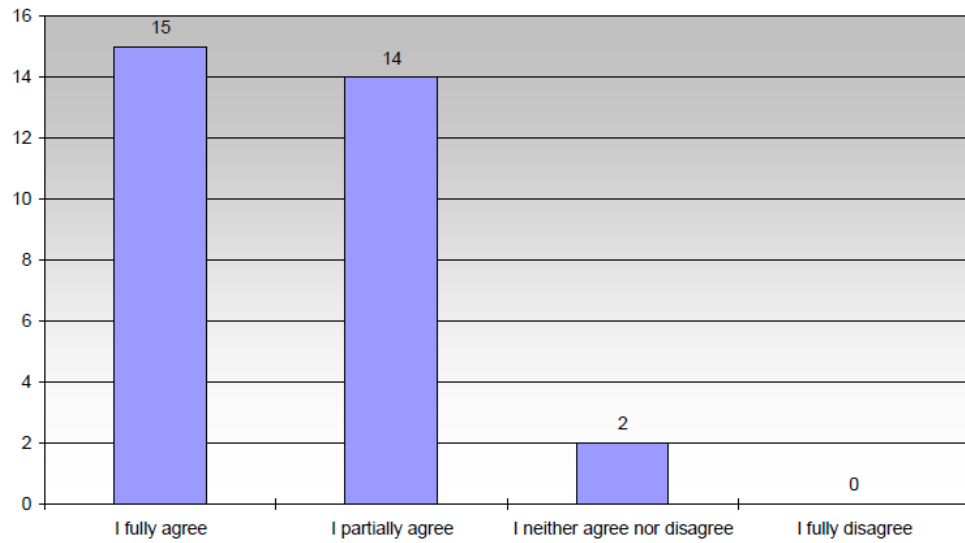
The majority of the monitors find the webinar focussed and useful, but also that it can be improved.

7.2.4 10: Which of the following best describes your opinion regarding the professional communication between the monitors?



The majority find that the professional communication between the monitors is spread across many domains.

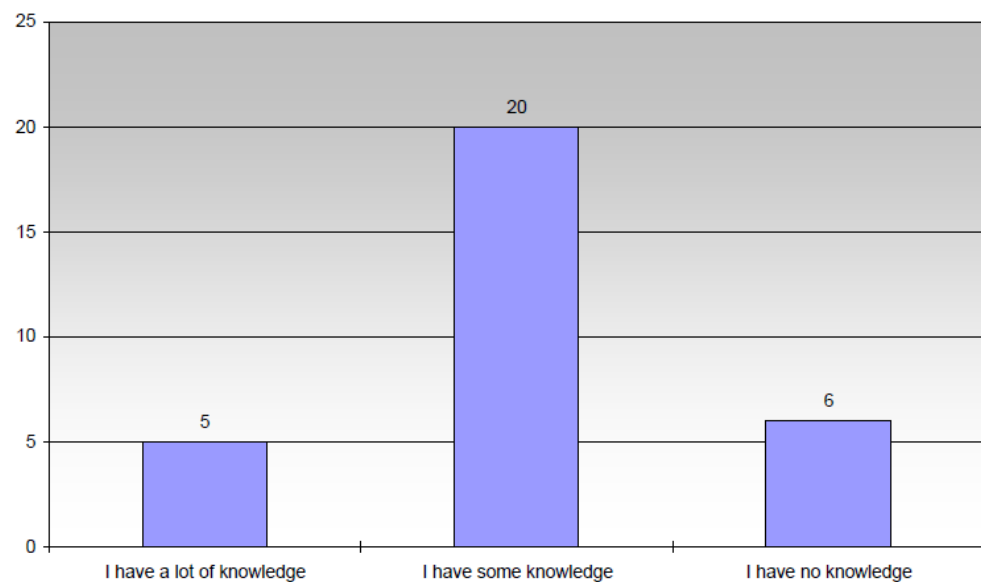
7.2.5 11: How do you agree to this statement: “The individual monitor has a high degree or influence on deciding which domain he/she will test”?



The majority of the monitors agree or partially agree that they have a high degree of influence on which domain they will test.

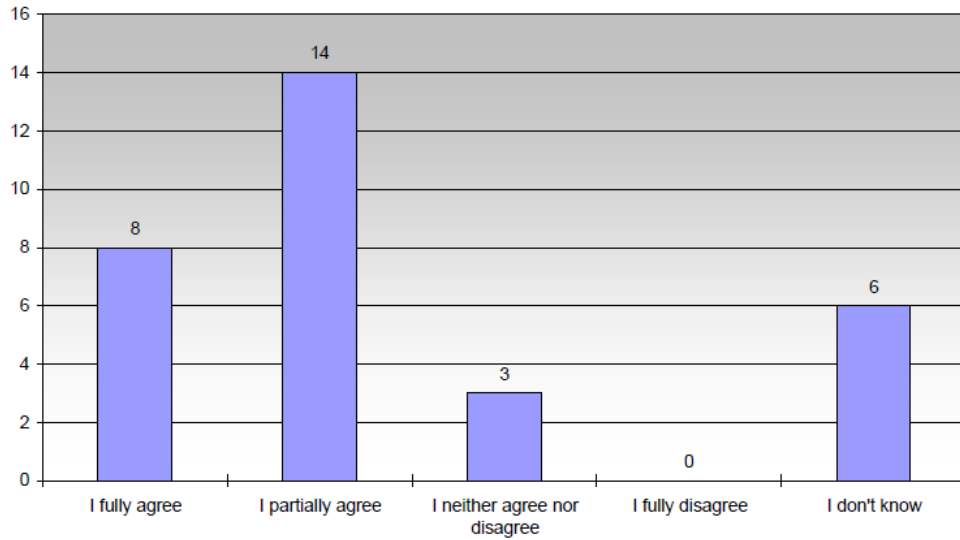
## 7.3 Knowledge regarding Quality Management

### 7.3.1 12: How would you describe your level of knowledge about Quality Management



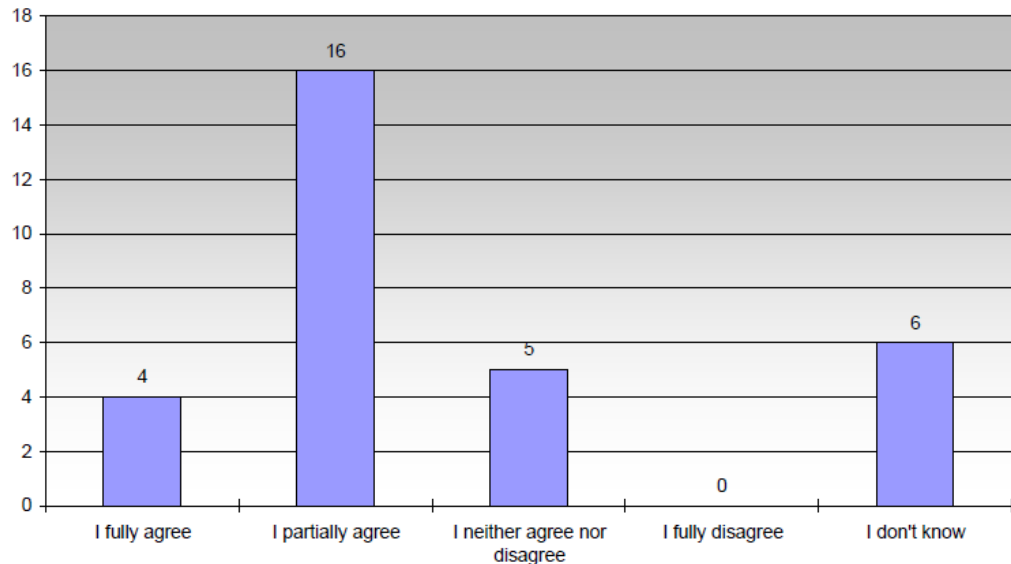
The majority of the monitors have some knowledge of Quality Management.

7.3.2 13: How do you agree to this statement: “A Quality Management System will improve the quality of the interoperability testing”



The majority of the monitors fully or partially agree that a Quality Management System will improve the interoperability testing.

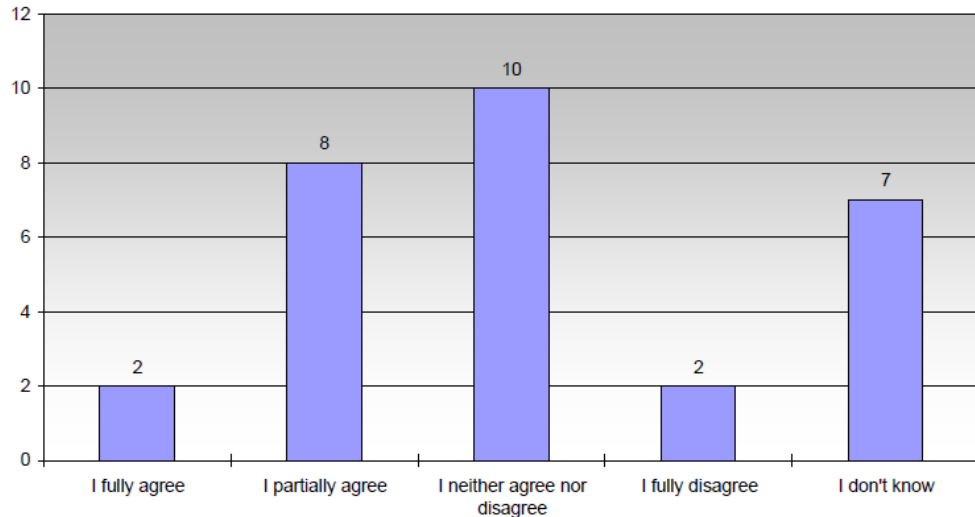
7.3.3 14: How do you agree to this statement: “A Quality Management System will improve the collaboration between the monitors, vendors and stakeholders”?



The majority of the monitors partially agree that a Quality Management System will improve the collaboration between the monitors.

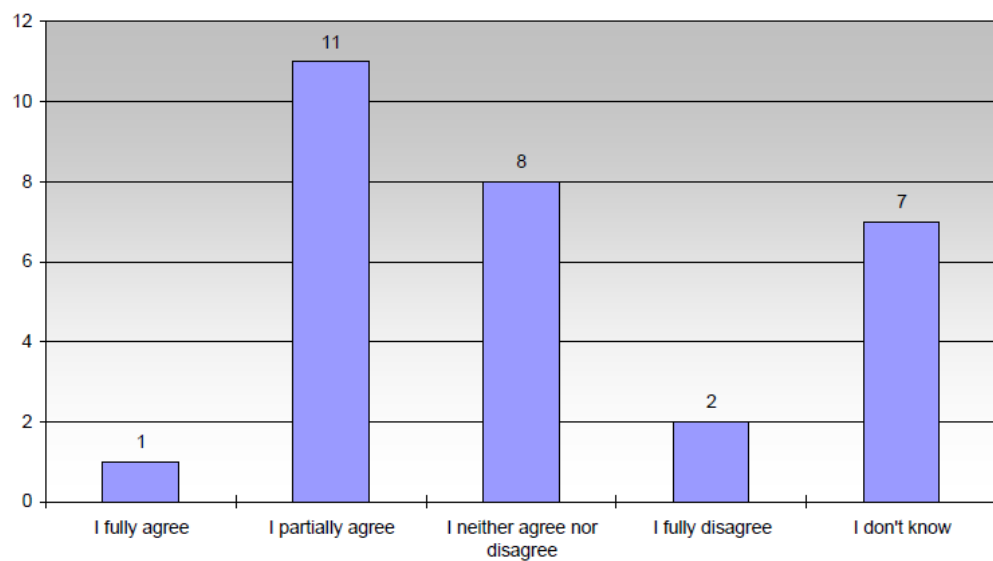
## 7.4 The need for changes

### 7.4.1 15: How do you agree to this statement: “Implementing a Quality Management System will not impose significant changes in the organisational structure for IHE”



In average, the monitors have responded that a Quality Management System will not impose significant changes in the organisational structure in IHE.

### 7.4.2 16: How do you agree to this statement: “Implementing a Quality Management System will impose significant changes in the interoperability testing procedures”



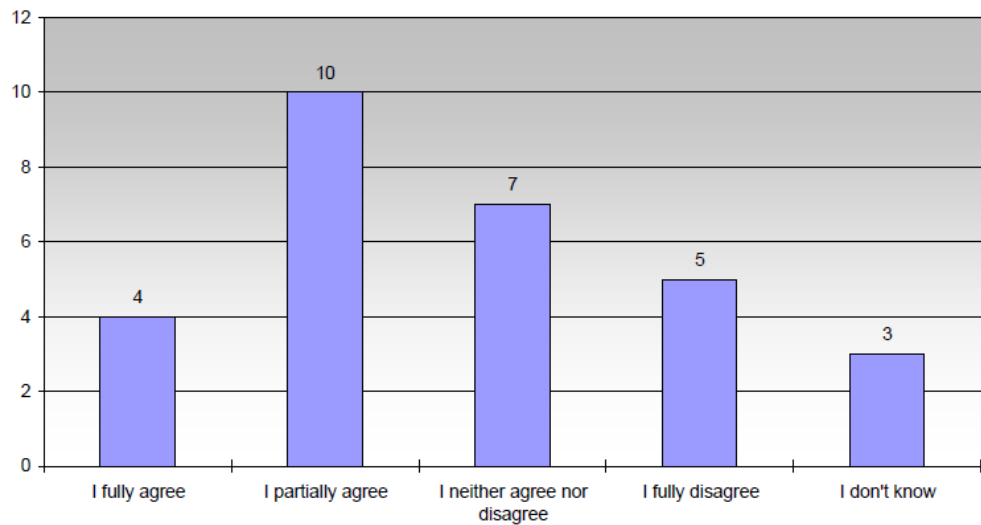


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In average the monitors have responded that a Quality Management System will only impose small changes in the interoperability testing procedures.

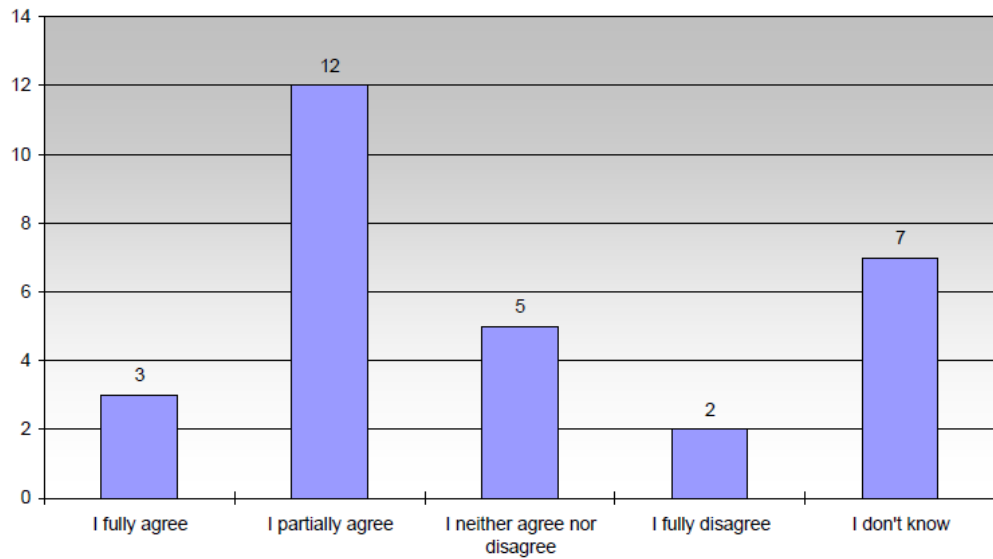
## 7.5 Readiness for changes

7.5.1 17: How do you agree to this statement: 'A Quality Management System is a fundamental tool to ensure the future existence of IHE Connectathon interoperability testing'?



The majority of the monitors agree that a Quality Management Systems is fundamental to ensure the future existence of IHE Connectathon.

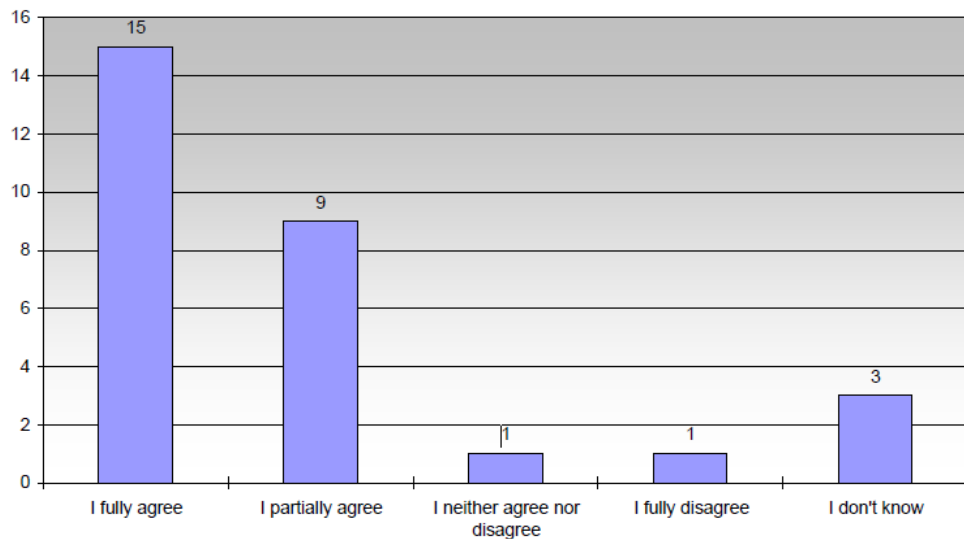
7.5.2 18: How do you agree to this statement: 'A Quality Management System will improve significant areas in my work as monitor'?



In average the monitors have responded that a Quality Management System will bring improvements in some areas of the work as monitor.

### 7.5.3

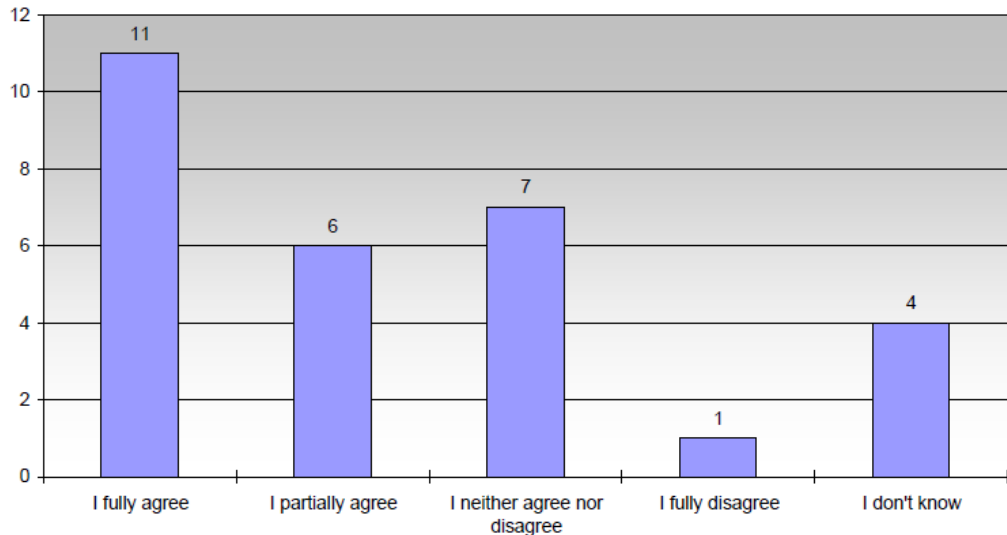
19: How do you agree to this statement: 'A Quality Management System will not threaten any of my professional competences'?



The majority of the monitors do not feel treat of their professional competencies if IHE are implementing a Quality Management System.

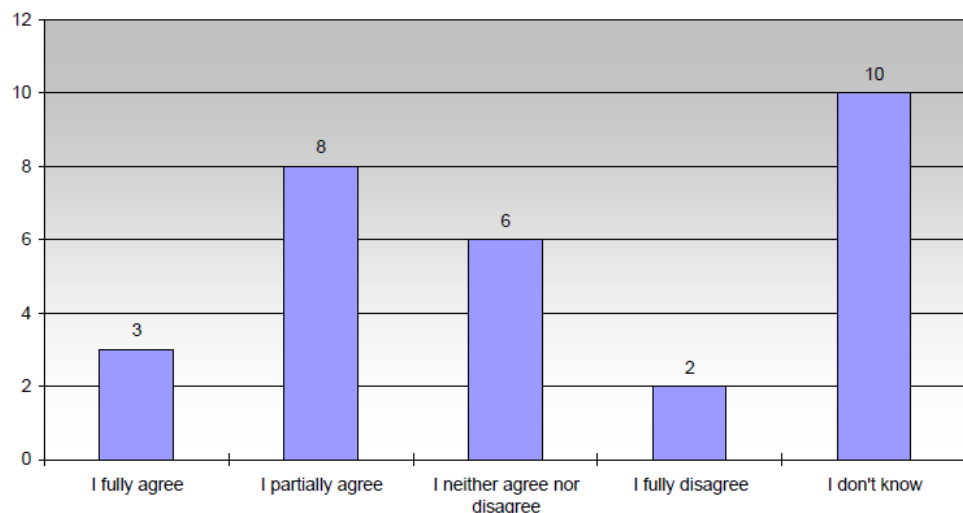
## 7.6 Handling of changes

7.6.1 20: How do you agree to this statement: 'I am confident that IHE will support me with the necessary education and information, so that I actively can take part in the Quality Management'?



The majority of the monitors are confident that IHE will support them with the necessary education and information so they actively can take part in the Quality Management System.

7.6.2 21: How do you agree to this statement: 'My colleagues in IHE are positive about a Quality Management System and will actively participate in its implementation and use'?



Most of the monitors trust that their colleagues in IHE will actively participate in the implementation and use of a Quality Management System.

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## 8 FOCUS GROUP INTERVIEW

A mini-workshop and a focus group interview were held on April 12<sup>th</sup> 2011 with 5 monitors and 3 persons from the HITCH project.

### 8.1 Agenda

Below is the agenda use for mini-workshop:

1. Welcome and presentation
2. The HITCH project
3. Objective for the mini-workshop
4. Focus group interview
5. Any other business

### 8.2 Questions

Based on the analysis of the questionnaire a number of questions were prepared for the discussion. Some examples are shown in the table below:

Questionnaire	Question for the focus group interview
8: Do you know if IHE is having objectives and goals for the Connectathon Interoperability Testing?	What objective and goals?
10: Which of the following best describes your opinion regarding the professional communication between the monitors?	What kind of information (e. g. testing procedures, quality, criteria, tools)?
12: How would you describe your level of knowledge about Quality Management	From where do you have the knowledge?  Do you have examples on the use of Quality Management for interoperability testing?
16: How do you agree to this statement: "Implementing a Quality Management System will impose significant changes in the interoperability testing procedures"	What changes (test procedures, tools)?
18: How do you agree to this statement: 'A Quality Management System will improve significant areas in my work as monitor'?	What will be improved?

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## 9 CONCLUSIONS

The main conclusions from the evaluation of the QMS are described in this chapter. The conclusions for the change readiness examinations are grouped by using the same structure as for the questionnaire.

The conclusions are based on the mini-workshop, the focus group interview and feed-back during the IHE Connectathon (11-15<sup>th</sup> April 2011).

### 9.1 Basic information

Interoperability testing is mainly done by engineers and computer scientists.

Most of the IHE Connectathon monitors have relatively few years experience as monitors (1-3 year). However there are also several with 4-8 years experience.

A well documented QMS will be an advantage when recruiting new monitors.

### 9.2 Knowledge regarding IHE Connectathon

The monitors are in general well aware of how IHE is running a Connectathon and actively involved in the planning of what systems and domains they are testing.

There is good collaboration between the monitors with sharing of knowledge and experience across the different domains (profiles) they are testing.

At the focus group interview it became evident that monitors are aware that objective and goals exist, but not precisely.

A Quality Management System should improve this.

### 9.3 Knowledge regarding Quality Management

In general, the monitors have some basic knowledge regarding Quality Management, but they do not have a deeper understanding on how it is related to the interoperability testing processes.

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The monitors can see the benefits in using the Quality Management System developed in HITCH and express that it will improve the quality of the interoperability testing including a formalised knowledge sharing between the monitors.

#### 9.4 The need for changes

The introduction and further implementation of a Quality Management System will probably not change much in the organisation structure.

However some changes in the current interoperability testing procedures are foreseen.

#### 9.5 Readiness for changes

IHE as an organisation seems to have the critical mass among the monitors regarding the readiness for change when implementing a Quality Management System.

The success and continued expansion of IHE Connectathon requires professionalism, which can be largely improved by a Quality Management Systems.

#### 9.6 Handling of changes

Based on the view of the monitors, IHE has the required organisation to handle the needed changes in the organisation by implementing a Quality Management System.

It will be important to engage not only the monitors as key persons but all persons who are involved in the IHE interoperability testing.