Quickscan QTI

Usability study of QTI for *De Digitale Universiteit*

Pierre Gorissen

11 July 2003
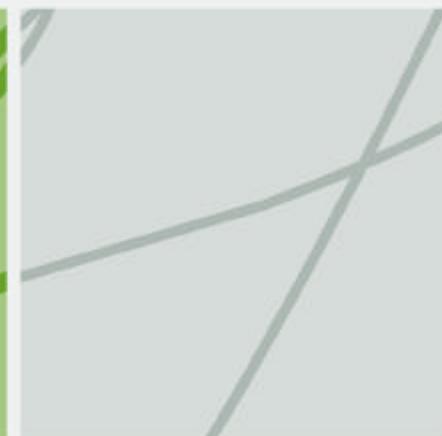
DU
Digitale Universiteit

samenwerken aan vernieuwing van het Hoger Onderwijs   Digitale Universiteit

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Summary

De Digitale Universiteit (DU) performed a quickscan to determine the usability of the IMS Question and Test Interoperability (QTI) specification as a format to store questions and tests developed for and by the consortium. The quickscan was carried out by Pierre Gorissen (P.Gorissen@Fontys.nl) and the original report is available in Dutch from the website of *De Digitale Universiteit* http://www.digiuni.nl/publicaties/
This is an unofficial translation of that report.

Like said, the aim of the quickscan was to determine how feasible the use of QTI within *De Digitale Universiteit* is at the moment. For that the e-learning applications currently used within the consortium were evaluated for their ability to use QTI. More than just a table with Yes/No answers, the quickscan also tried to explain why some files couldn't be imported and tried to construct QTI files that could be imported in as many as possible of the available applications.
The quickscan looked at the following applications: Respondus, QuestionMark Perception, N@tschool!, Blackboard, WebCT, Learn eXact, Testvision, TeleTOP, Lotus LearningSpace. To determine the priority of the functionalities, the requirements of the DU project Law Online ("Rechten Online") currently evaluating the use of QTI for their project were taken into account.
Only the applications that were actually able to import QTI, whether that was because they had a QTI import option or because there was a third party tool to import the QTI files into the application, were researched in depth. At the moment, Lotus LearningSpace, TeleTOP and Testvision didn't have QTI import capability or existing third party import tools for QTI. The test set used for the quickscan is available online at the DU website.

Results
The quickscan shows that it is possible to construct a basic set of QTI questions that can be imported by all the applications that support QTI in one way or the other. As soon as more that just the basic elements of QTI are being used, one or more of the applications fail to correctly import and/or interpret the QTI files. Respondus, which main purpose is to serve as an interface for VLEs that don't have QTI import/export capabilities shows there is a growing market for QTI support even when the VLE vendors don't implement support themselves.
The use of a test plan based on the requirements of an actual project helped to keep the needed test set as small as possible. Though not every single functionality and option of QTI has been tested, the tests were able to draw a complete enough picture of the possibilities. It also makes a big difference whether you're trying to create a test file that can be imported in as many as possible applications, or a test file that is as complex as possible. The first goal is much harder to achieve.

Recommendations
The Law Online ("Rechten Online") project isn't the only project within the DU involving the development of items and tests. It is recommended that other relevant projects also fill in the questionnaire used to determine the needs of the Law Online project. Where QTI has a good enough fit it is recommended to use it so that the pool of available QTI items is a big as possible and feasible.
None of the applications tested in this quickscan have support for all options of the QTI specification. That itself is not a problem, but there is a need for an increase of the support because of lack of broad support for things like sections, the use of images and sound in question and last but not least metadata.
The quickscan only researched the import possibilities of the tools and didn't take the export functionalities into account. Additional work needs to be done in that area. Where possible this should be done in close cooperation with others within the Netherlands and internationally.

1   Introduction

The IMS Question and Test Interoperability (QTI) specification is being considered for a number of projects of *De Digitale Universiteit* (DU) as a mean to store question items and assessments and to exchange them between e-learning applications. Implementing the IMS QTI specification is complex and just the fact that a vendor claims an application supports QTI isn't enough to ensure problem free exchange. This quickscan developed a number of QTI test files and tried to import them into a number of applications to see whether or not they are able to import them.

1.1   Aim of the Quickscan QTI

The aim of this quickscan is to determine to what extend the e-learning applications that are being used within the Dutch DU consortium are able to import QTI files. More that just a matrix (Yes/No) the scan also tries to explain why an import failed and if/how a workaround for the problem is possible.

1.2   Conditions

For this quickscan a number of conditions have been formulated:
- ?? This quickscan uses IMS QTI 1.2
- ?? These applications will be considered:
  - o Respondus 2.0.2
  - o QuestionMark Perception 3.4.0.2
  - o N@tschool! 7.0 UP2
  - o Blackboard 5.5 en 6.0
  - o WebCT 4
  - o Learn eXact 1.7
  - o Testvision
  - o TeleTOP
  - o Lotus LearningSpace
- ?? The scan takes a two-step approach. First, a check will determine if an application has QTI import functionality, either itself or by using an existing third-party application.
- ?? During the second phase a detailed QTI import test is performed.
- ?? Only QTI assessments, sections and items are tested, not the results handling. Only these item types will be tested: multiple choice, true/false, multiple-response, and fill in the blank, essay.
- ?? The item types used for the project Law Online ("Rechten Online") will also be taken into account. The QTI material created for the project will be tested.
- ?? The quickscan will take no longer than 60 hours.

1.3   Project team

The quickscan study was carried out by Pierre Gorissen, Fontys University of Professional Education. Main contact for the DU is Frank Kresin (ESP).

1.4   Deliverables

The quickscan resulted in:
- ?? a report in Dutch with the results of the quickscan;
- ?? a set of QTI files that can be used to check QTI import.

This translation isn't an official deliverable from the quickscan.
The files and the Dutch report can be downloaded from: http://www.digiuni.nl/publicaties/

1.5   Results of the first selection phase

The DU requested that as many as possible of the applications that are being used by the partners of the consortium would be included in the quickscan. During the first phase of the quickscan that meant including a total of ten applications. There were five VLEs: N@tschool! 7.0 UP2, Blackboard 5.5 en 6.0, WebCT 4, TeleTOP, Lotus LearningSpace and two assessment applications: QuestionMark Perception 3.4.0.2 and Testvision. The DU requested that the LCMS Learn eXact 1.7 and the assessment interface tool Respondus 2.0.2.[1]

The VLEs Blackboard and WebCT don't have QTI import capabilities, but because they were able to import QTI files thanks to the Respondus application, they were both included in the second phase of the quickscan. Three of the applications included in the first phase did not have QTI import, or third party tools to do that for them. These three applications are:

??   Testvision, see: http://www.teelen.nl/testvision/ (Dutch)
??   TeleTOP, see: http://www.teletop.nl/index_uk.htm
??   Lotus LearningSpace version 3.5, see: http://www.lotus.com/products/learnspace.nsf/wdocs/homepage/
Because there were no known means at the moment of the quickscan to import QTI files into these tools they were not included in the second phase of the scan. That doesn't mean however that these applications can't be extended with QTI import capabilities. For both Testvision and TeleTOP it was indicated that support could be added when there was sufficient demand for it.

1.6   Acknowledgements

The shorter the available time span for a project, the greater the dependence on others to complete it in time. This quickscan wouldn't have been possible without a lot of people. Thank you all!
In alphabetic order:
??   Frank Benneker from the UvA arranged a test account for Blackboard 6.0,
??   Silvester Draaijer from the VU arranged a test account for Blackboard 5.5,
??   Quirijn Hamel of the UT answered my questions concerning TeleTOP,
??   Henry Hermans of the OUNL gave feedback on the Dutch draft version of the report,
??   Hans Kok of Edugolive arranged a test account for WebCT 4,
??   Alexander Kremers answered my questions regarding Testvision,
??   Frank Kresin of the DU arranged a test account for Learn eXact 1.7 with the help of Giunti Labs,
??   Henk van de Laar of Fontys allowed my to spend time on this quickscan,
??   Coby Malogrino of Fontys arranged the test account for QuestionMark Perception,
??   Marnella Piet of the UvA filled in the questionnaire for the Law Online project,
??   Pete van der Spoel and Matthijs Siers of the HvU answered my questions concerning Lotus LearningSpace,
??   Colin Tattersall of the OUNL reviewed the original project proposal,
??   Threeships Enterprises arranged a test account for N@tschool! 7 UP2,
??   Marc Verhooren of the OUNL filled in the questionnaire for the Law Online project.

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[1] All applications that made it to the second phase are described in section 3.2 on page 13.

2   Question and Test Interoperability Specification (QTI)

When trying to reuse educational content in different VLEs, there are a couple of options. The first one is to print out all the content and enter them again in the second VLE by hand, or more advanced, using cut and past to do it the digital way. As soon as the amount of content grows a bit, that isn't a feasible option. A second method could be to build an interface between the VLEs so they can look into each other's databases and retrieve the content there. If the number of VLEs involved however grows, the number of interfaces and thus the complexity grows rapidly. The third option is to agree on a common exchange format. That format preferably is an open format developed by a neutral organization, and not by a single vendor.

The Question and Test Interoperability Specification (QTI), developed by the IMS Global Learning Consortium, is such a neutral exchange format for:

- ?? questions (items)
- ?? groups of related questions (sections)
- ?? complete assessments

It also is an exchange format for the results of those assessments.

2.1   IMS Global Learning Consortium, Inc.

IMS Global Learning Consortium, Inc. (IMS) is developing and promoting open specifications for facilitating online distributed learning activities such as locating and using educational content, tracking learner progress, reporting learner performance, and exchanging student records between administrative systems. IMS has two key goals: Defining the technical specifications for interoperability of applications and services in distributed learning, and supporting the incorporation of the IMS specifications into products and services worldwide. IMS endeavours to promote the widespread adoption of specifications that will allow distributed learning environments and content from multiple authors to work together (in technical parlance, "interoperate")[2]. The first IMS specifications were released in 1999; at the moment there are a dozen specifications available:

- ?? IMS Question & Test Interoperability Version 1.2.1
- ?? IMS Enterprise Specification Version 1.1
- ?? IMS Metadata Specification Version 1.2.1
- ?? IMS Content Packaging Specification Version 1.1.3
- ?? IMS Metadata Specification Version 1.2
- ?? IMS Question & Test Interoperability Specification (Lite) Version 1.1
- ?? IMS Learner Information Package Specification Version 1.00
- ?? IMS Simple Sequencing Version 1.0
- ?? IMS Learning Design Version 1.0
- ?? IMS Digital Repositories Specification Version 1
- ?? IMS Reusable Definition of Competency or Educational Objective Version 1.0
- ?? IMS Learner Information Package Accessibility for LIP Version 1.0 Public Draft

The version numbers show that some of the specifications are relatively new (having a version 1.0 or even draft status), while others have gone through a number of revisions based on input from the field. For each specifications an information model (describes what is in the specification), a XML binding (describes the technical implementation) and a best-practice and implementation guide (advise about how to use and implement the specification). The documents can be downloaded or read online, free of charge, at the IMS website: http://www.imsglobal.org/

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[2] Source: http://www.imsglobal.org/

2.2   QTI 1.2

The first official release of the Question and Test Interoperability (QTI) specification dates from June 2000. The most current release is version 1.2. On the IMS website the three base documents for the Assessment, Section, Item (ASI) part of the specification are:

- ??   IMS Question & Test ASI Best Practice Guide
- ??   IMS Question & Test ASI XML Binding Specification
- ??   IMS Question & Test ASI Information Model

There are two documents covering results processing for assessments, sections and items and the selection and ordering of items:

- ??   IMS Question & Test ASI Outcomes Processing Specification
- ??   IMS Question & Test ASI Selection and Ordering Specification

The results reporting part of the specification also consists of three base documents:

- ??   IMS Question & Test Results Reporting Best Practice and Implementation Guide
- ??   IMS Question & Test Results Reporting XML Binding Guide
- ??   IMS Question & Test Results Reporting Information Model

To not get lost right away, there is an overview document available:

- ??   IMS Question & Test Interoperability Overview

Besides these documents a great number of QTI files, covering the different parts of the specification are available. These files weren't used for the quickscan because the customs created ones were easier to use for the scan.

QTI is a complex and extensive specification. Probably the biggest problem for a vendor trying to implement the specification is that it was designed with flexibility for the item developer in mind. One thing that results in is that there are multiple, different, structures in QTI for the same end result. Look at this example of a multiple choice question with answer options A through E with C being the correct answer:

Which of the following people has not yet been prime minister of the Netherlands?
A)   Wim Kok
B)   Ruud Lubbers
C)   Wouter Bos
D)   Dries van Agt
E)   None of the above

Example 1 multiple-choice question

For an application it would be easiest if you indicated what the correct answer was. But that is not the case in QTI. The specification allows you to award a score and a feedback for each of the possible answer options. Now if all options have a score of 0 (zero) and only one has a score of 1 (one), than an importing application can be reasonably sure what is the correct answer. But QTI also allows you to for example have negatives scores, say you want to subtract one point (score = -1) if someone chooses answer option E. That makes interpreting the QTI for an importing application suddenly much more complex.
Another example is a complex question like this:

Which of the following people has not yet been prime minister of the Netherlands?
A)   Wim Kok
B)   Ruud Lubbers
C)   Wouter Bos
D)   Dries van Agt
E)   None of the above, but ………………………….. (Fill in a name)

Example 2 complex question

In this case, when you choose options E), you also are expected to fill in a different name. For an application it is not easy to recognize these variations[3].

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[3] This second complex question has *not* been tested in this quickscan.

The interpretation of the QTI file structures themselves isn't that easy either. There are many possible combinations, not all of them useful for daily use. The figure below shows a couple of useful combinations:
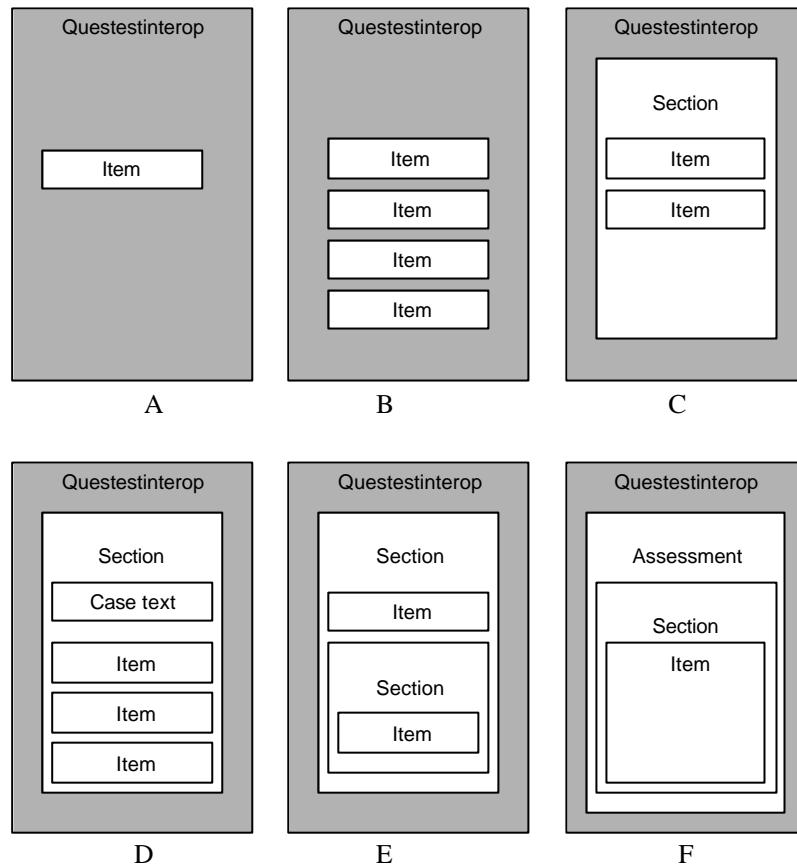
Figure 1 A couple of possible QTI constructs

The file (with the beautiful name "Questestinterop") might contain a single question (A), or a couple of individual questions (B). If you want to use a case text with a couple of related questions, the file might look like (C) or even (D). Sections can contain both items and other sections (E). Those sections can then be grouped to an assessment (F). An assessment can't just contain individual items; they have to be contained within a section. On the next page you can find see simple XML implementation of such a QTI file. It is the simple multiple-choice question with one correct answer we saw earlier:

> Which of the following people has not yet been prime minister of the Netherlands?
> A) Wim Kok
> B) Ruud Lubbers
> C) Wouter Bos
> D) Dries van Agt
> E) None of the above

Example 3 simple multiple-choice question

The XML example on the next page does not yet contain response processing, scoring of the answer and showing feedback. That would have made the listing more complicated and longer. The files in the test set do contain those elements.

```
<questestinterop xmlns="http://www.imsglobal.org/xsd/ims_qtiasiv1p2"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://www.imsglobal.org/xsd/ims_qtiasiv1p2 ims_qtiasiv1p2.xsd">
    <qticomment>
    A simple multiple choice question.
    </qticomment>
    <item title="QTI_MC_101" ident="QTI_MC_101">
        <presentation label="QTI_MC_101">
            <flow>
                <material>
                    <mattext> Which of the following people has not yet been prime minister of
the Netherlands?</mattext>
                </material>
                <response_lid ident="MC_101_Q01" rcardinality="Single" rtiming="No">
                    <render_choice shuffle="Yes">
                        <flow_label>
                            <response_label ident="A">
                                <material>
                                    <mattext>Ruud Lubbers</mattext>
                                </material>
                            </response_label>
                        </flow_label>
                        <flow_label>
                            <response_label ident="B">
                                <material>
                                    <mattext>Wim Kok</mattext>
                                </material>
                            </response_label>
                        </flow_label>
                        <flow_label>
                            <response_label ident="C">
                                <material>
                                    <mattext>Wouter Bos</mattext>
                                </material>
                            </response_label>
                        </flow_label>
                        <flow_label>
                            <response_label ident="D">
                                <material>
                                    <mattext>Dries van Agt</mattext>
                                </material>
                            </response_label>
                        </flow_label>
                        <flow_label>
                            <response_label ident="E" rshuffle="No">
                                <material>
                                    <mattext>None of the above </mattext>
                                </material>
                            </response_label>
                        </flow_label>
                    </render_choice>
                </response_lid>
            </flow>
        </presentation>
    </item>
</questestinterop>
```

Example 4 XML QTI implementation of a simple multiple choice question

You of course don't want to expose the item author to this kind of complex XML. Instead you would want to provide them with a user-friendly application that creates this XML. But that is the subject of a different test.

2.3   QTI-Lite 1.1

Because the QTI specification is rather complex, IMS also came up with a lite version (QTI-Lite). The lite version has fewer options, making it easier to implement for a vendor. The lite specification can, like the other specifications, be downloaded from the IMS website: http://www.imsglobal.org/question/#qtilite
If a file is QTI-Lite conformant, then it automatically also is QTI conformant. For this quickscan the relevant differences between the two specifications are that QTI-Lite does not have support for:
- ??   essay items
- ??   fill in the blank items
- ??   the <hints> or <solutions> element
- ??   metadata
- ??   sections and assessments
- ??   the elements <flow></flow>, <flow_mat></flow_mat> and

Because Learn eXact 1.7 only supports QTI-Lite and not the full specification, and because of that at first refused to import any of the test files, an extra QTI-Lite test set has been created base on the original set of files. The conversion process wasn't complex: a couple of question types simply weren't supported (fill in the blank, essay) so those files couldn't be converted. In all other files the elements <flow></flow>, <flow_mat></flow_mat> en <flow_label></flow_label> were removed from the remaining files. That was enough to make them QTI-Lite conformant.

3   The test set and the testing process

This chapter covers the structure of the test set, the applications that have been tested and the test cycle itself.

3.1   What is in the test set

It was impossible, and considered unnecessary, to test all the possible options of the QTI specification during this quickscan. Therefore the test set concentrates on functionalities that can be achieved. The following list shows possible functional results:

1	Items
1.01	use of multiple choice questions (one answer option)
1.02	use of multiple response questions
1.03	use of drag and drop questions
1.04	use of essay questions
1.05	use of fill in the blank questions
1.06	use of hot spot questions
1.07	use of hints in a question
1.08	showing the correct answer for a question
1.09	being able to have different feedback for each possible answer option
1.10	being able to have feedback for correct answers
1.11	being able to have feedback for incorrect answers
1.12	being able to assign different scores to each answer option
1.13	the use of plain text for a question and/or the feedback
1.14	the use of HTML code text for a question and/or the feedback
1.15	the use of images in a question and/or the feedback
1.16	the use of video in a question and/or the feedback
1.17	the use of audio in a question and/or the feedback
1.18	the use of other objects (for example Flash) in a question and/or the feedback
1.19	the use of metadata for an item
1.20	being able to store the learning-objective of an item
1.21	being able to store the rubric for an item
1.22	being able to have the answer options displayed in random order
1.23	being able to use matching items
2.	Sections
2.01	use of sections
2.02	being able to store learning-objectives for a section
2.03	being able to store the rubric for a section
2.04	being able to store text for a section
2.05	being able to calculate a score for a section
2.06	being able to give feedback based on the calculated score for a section
2.07	being able to store metadata for a section
2.08	the ability to display the questions in a random order
2.09	the ability to display a question based on the answer for a previous question
3.	Assessments
3.1	being able to exchange assessments
3.2	being able to store learning-objectives for an assessment
3.3	being able to store the rubric for an assessment
3.4	being able to store text etc. that is relevant for the complete assessment
3.5	being able to calculate a total score for the assessment
3.6	being able to give feedback for the assessment based on the calculated total score
3.7	being able to store metadata for the assessment
3.8	being able to have sections and/or items in an assessment displayed in random order
3.9	the ability to display a question based on the answer for a previous question

The list has been reviewed by the project members of the Law Online project and they prioritised the functionalities in the list. The result of that review van be found in Annex A on page 28. Based on that, and feedback from others, the test set was constructed. An overview of the set can be found in Annex B on page 30.

3.2   The applications that have been tested

After a first quick review round, seven applications were put through the more detailed test of importing the QTI test files. Those seven applications will be briefly introduced in this section.

3.2.1   Respondus 2.0.2

Respondus started off as an application to create questions and assessments for the Blackboard, WebCT and (the not in this quickscan included) eCollege applications. Version 2 cam e with a couple of enhancements that made the application a lot more interesting. Respondus version 2 can now, besides the already existing support for plain text and RTF, import QTI files. It can also export QTI files and convert files created in one form at to another. That means you could download questions created in Blackboard into Respondus and then upload them into WebCT or save them to disc as QTI files and vice versa.
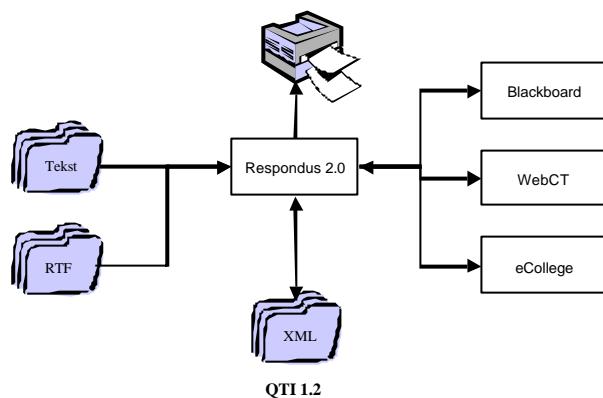
Figure 2 Question and assessment exchange options in Respondus 2.0

For this you don't need to change anything on the server of the VLE. All Respondus needs is some information about the server (URL for the logon page, username and password etc.). Respondus can then show what cours es you've got access to, what assessments there are etc.

Website: http://www.respondus.com/
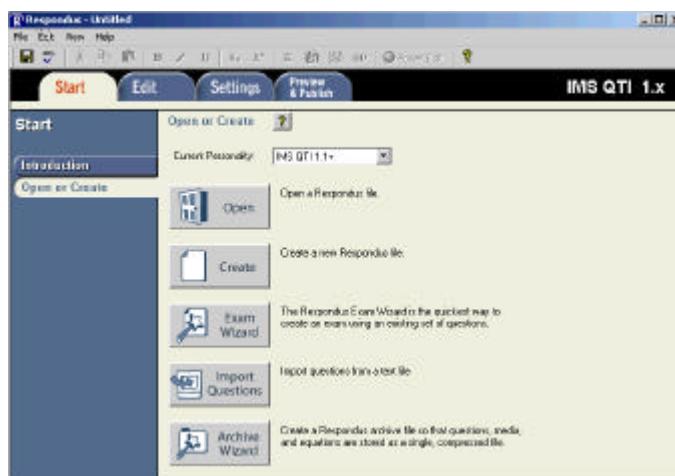
Figure 3 Screenprint Respondus

3.2.2 QuestionMark Perception 3.4.0.2

QuestionMark Computing Ltd., the company behind QuestionMark Perception, was and is closely involved in the development process of the IMS QTI specification. QuestionMark Perception specializes on the development of assessments and questionnaires on the Internet or an intranet. Tests can be served from the Perception server and the results can be analysed using the Enterprise Reporter. For *De Digitale Universiteit*, QuestionMark Perception is the official application to be used for assessments. For this quickscan at first both the Question Manager (to create items) and the Assessment Manager (to compile assessments from those items) were reviewed. Because only the Question Manager supports import (and export) of QTI files, the actual tests were only done using the Question Manager.

Website: http://www.questionmark.com/
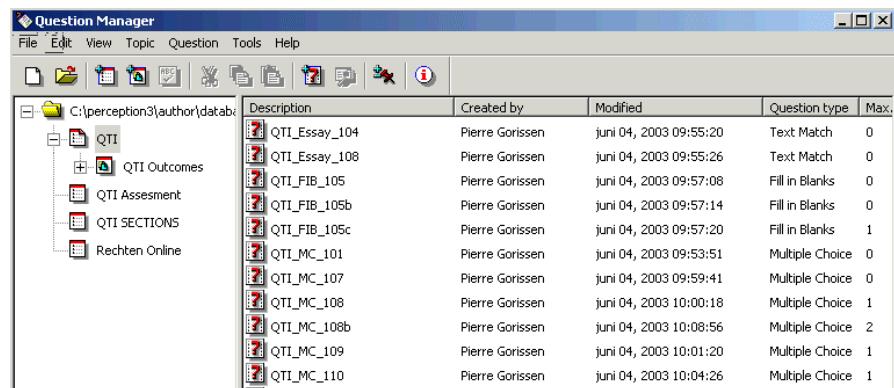
Figure 4 Screenprint Question Manager

3.2.3 N@tschool! 7.0 UP2

N@tschool! is a Dutch VLE from the Rotterdam based Threeships Enterprises company. It offers a wide range of functionality like fore example a content repository, an assessment centre, a project centre, a digital portfolio and a learning management system [4]. For this quickscan, only the assessment centre has been reviewed. Within the centre test items, sections and assessments can be created. They can be displayed on the screen or exported to Word documents. N@tschool! has its own support for import and export of QTI files.

Website: http://www.natschool.com/ (Dutch)
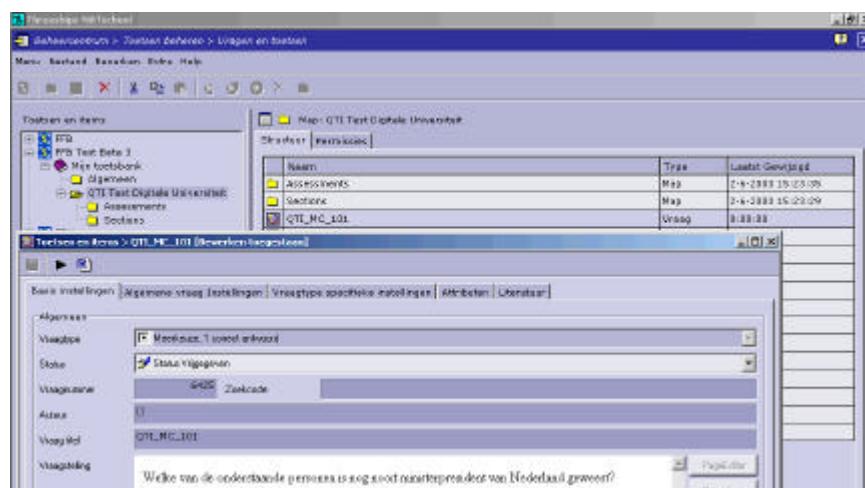
Figure 5 Screenprint N@tschool!

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[4] Though it is a Dutch product, the interface language can be set to English on a per user basis.

3.2.4 Blackboard 5.5 en 6.0

Market leader in the VLE arena in the Netherlands is Blackboard. For this quickscan both the much-used 5.5 version and the newer 6.0 version have been tested. Though Blackboard is one of the founders of IMS, its VLE offer no QTI import options for a teacher/course developer. It is said that the code is in place to import the QTI files but at the moment, for this quickscan, that couldn't be tested. Therefore the quickscan used Respondus to test the import into Blackboard.
Blackboard has an assessment manager and a question pool.

Website: http://www.blackboard.com/

Figure 6 Screenprint Blackboard 5.5

3.2.5 WebCT 4

The third reviewed VLE in this quickscan is WebCT. It too has, besides the ability to store content, create discussion forums etc., an extensive assessment module with a question database. WebCT is very active within the IMS consortium. But, like Blackboard, it doesn't provide a QTI import option for a course developer. For this quickscan, Respondus has been used to test the QTI import into WebCT.

Website: http://www.webct.com/

Figure 7 Screenprint WebCT 4

3.2.6 Learn eXact 1.7

Learn eXact, developed by Giunti Interactive Labs is a Learning Content Management System (LCMS). The system consists of a couple of main components: the eXact Packager, the eXact Siter, and the eXact Lobster. During this quickscan the eXact Packager has been tested. The Question Database of the Packager, which handles the import of the test files, does not support QTI, but QTI-Lite. Because Learn eXact is going to be used as the central LCMS for *De Digitale Universiteit*, an exception to the rule that the applications had to support QTI was made and a special QTI-Lite set was created.

Website: http://www.learnexact.com/
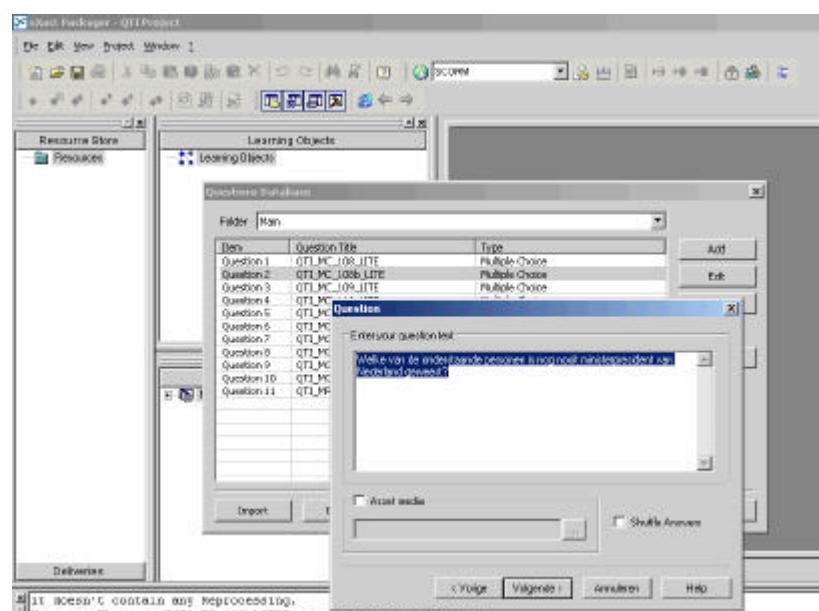
Figure 8 Screenprint Learn eXact Packager

Besides using the Questions Database to import the QTI-Lite files, Learn eXact can also store the files in the so-called Resource Store. The files aren't being interpreted and rendered, but stored as single XML objects. Both the files in the Question Database and the Resource Store can later be packaged into an IMS Contentpackage[5]. Because that is out of the scope of this quickscan, it has not been researched any further. It is recommended however that that be done. To illustrate the export option, the test set for this quickscan has also been packaged as an IMS Contentpackage and added to the zip file with the test set which can be downloaded from the DU website. The quickscan restricted itself to the use of the Question Database of the Learn eXact Packager and thus only the QTI Lite import option.

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[5] IMS Contentpackage is another IMS specifications describing the way files can be packaged for transport between applications. See: http://www.imsglobal.org/content/packaging/

3.3   project Law Online ("Rechten Online")

The project Law Online develops electronic learning material for the Bachelor course Law. The material is being developed in EML (Educational Modelling Language). Partners in the project are the Open University of the Netherlands (OUNL) and the University of Amsterdam (UvA). The UvA uses Blackboard 5.5 and thus isn't able to run the EML material in their VLE. Because of that the project also is looking for alternatives. One of the researched alternatives is to convert parts of the EML material into QTI after which it can be imported into Blackboard using Respondus 2.0. Since it was a good use case for real QTI material, this quickscan also had a look at the QTI material that was being produced by the project.

The structure of the material for the Law Online looks like structure (D) from Figure 1 on page 9 which you can see on this page also. The resulting QTI material consists of a case text with a number of related questions in a section.

It is important to note btw that not all the EML material can be converted to QTI in this way, some EML constructs cannot be converted to QTI. The quickscan however only looked at the converted material.
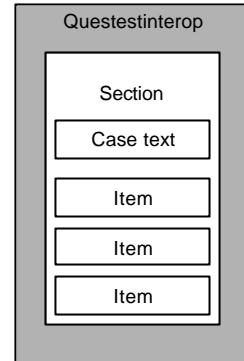
Figure 9 base structures Law Online project material

3.4 Overview test cycle

Figure 10 shows an overview of the complete test cycle for this quickscan:
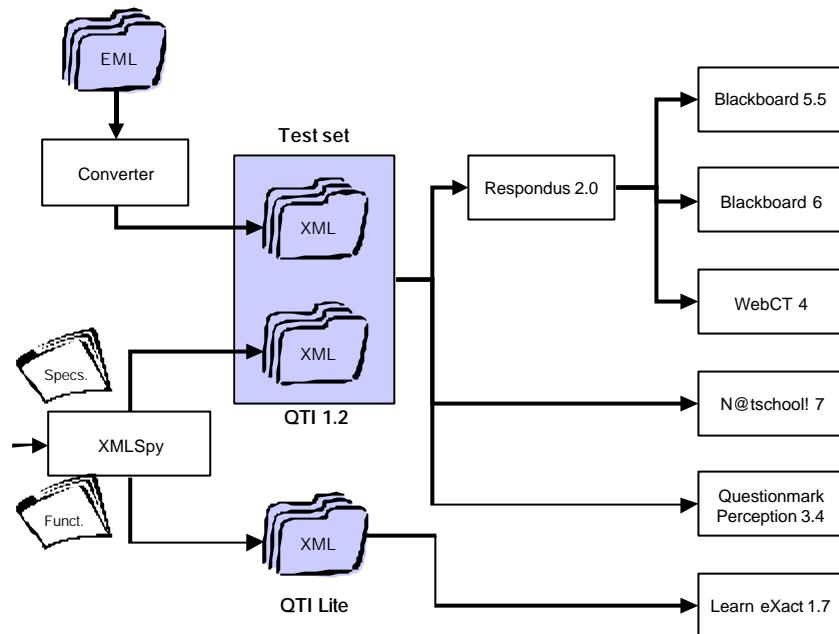
Figure 10 overview test cycle

The test set contains about twenty, in XMLSpy created and validated, files with single items, a couple of files with sections and a single assessment file. The Law Online project provided a file that could be used to test the import of the QTI generated by their EML-QTI converter. For the tests with Learn eXact, the files, where possible have been converted to QTI-Lite.

N@tschool! 7 and QuestionMark Perception 3.4 have their own QTI import option, so there the import was direct. For the Blackboard 5.5, Blackboard 6 and WebCT 4 tests, the test set first has been imported into Respondus 2.0. The QTI-Lite files were imported directly into Learn eXact. For all applications, including Respondus 2.0, a test form has been filled in stating the results of the test.

All test files can be downloaded as a single zip file from the DU website: http://www.digiuni.nl/publicaties/

4 Test results

As you can see in Figure 10 on page 18, the QTI files were imported in three of the seven applications directly. The three applications are Respondus, N@tschool! and QuestionMark Perception. The tests for Learn Exact were done using the QTI-Lite set. The import into both Blackboard versions and into WebCT was done through Respondus. Annex C on page 33 show a summary of the test results while Annex D, starting on page 36 goes into more detail. In that second annex, it also is explained, where possible, what failed and why in case of a failure to import the file. Because of their dependency on Respondus to import QTI, both Blackboard and WebCT were also restricted to the import capabilities of Respondus for their import.

4.1 Respondus 2.0.2

Respondus can import QTI files only within the "QTI 1.1+ personality", not in the Blackboard or WebCT personality. Imported QTI files can't be added to existing Respondus files, like you can do with plain text import. Because the transfer to Blackboard and WebCT is easier with all questions in the same Respondus file, you'll need to do some extra work. First you'll have to import all the questions from the test set one by one (all twenty-two of them). Then create an empty Respondus file and import the twenty-two files into that one by one. That file you can then convert to the wanted personality and use to upload the questions to the VLE. There is room for improvement here.

Respondus can import the multiple-choice items, the multiple response items and the essay items. For the fill in the blanks questions there is a restriction of only one FIB element to be used at the end of the question wording.

The use of HTML and/or images is possible in the question wording, the feedback and the answer options. If the item contains images using the QTI <matimage> element, Respondus asks during import for the location of the images.

Where applicable you can use feedback per answer option and general feedback.

Special characters need some extra attention to get them imported correctly. See also the side text on this page about that. At first there were some problems when trying to get the feedback at the expected location in Respondus. Importing the feedback per answer option was easy, but filling the general feedback and the correct/incorrect feedback proved to be more difficult (but once you know how it needs to be it, it is easy again). Respondus doesn't import metadata, learning-objectives, rubrics or hints. There is no support for sections and/or assessments, though the individual items from those files are imported.

> Special characters like ë and é are often used in Dutch, but aren't imported correctly by all applications. For Respondus and QuestionMark Perception you'll need to convert for example *ë* to *ë* or ë. Though it is no error, because it simply are the Unicode character codes for ë, it is annoying primarily because not all editors have support for it. Microsoft Word doesn't convert ë to ë when you export a Word document to HTML. If you're on the default setting in Microsoft FrontPage the ë will get converted automatically (back) into ë in the HTML code. OpenOffice 1.1 does show it is possible to support the conversion natively when exporting to HTML.

Side text 1 Special characters

4.2 QuestionMark Perception 3.4.0.2

QuestionMark Perception allows you to create "Topics" as folders for the QTI items, which can be imported directly in the folder of choice. The import of multiple choice, multiple response, essay questions and fill in the blank questions was possible, though there sometimes are things that can cause problems during import.

One of those things is that QuestionMark Perception expects multiple-choice questions to have feedback per answer option including an indication of the score per answer option. That is needed to guarantee correct import. It is the only application in this quickscan that reads the attribute *continue* within the <resprosessing> element and actually does something with it. Problem here is that that value wasn't present in the test set and it has a QTI default value of *No*. For the multiple response questions that lead to unexpected results during the response processing in QuestionMark Perception.

QuestionMark Perception also was the only application in this quickscan that was able to interpret and display a file with multiple FIB elements (QTI_FIB_105.XML) in the correct way.

Use of HTML is possible, but images in the answer option weren't displayed. Special characters need some extra attention to get them imported correctly. See also the side text on this page about that.

QuestionMark Perception did not import metadata or hints, but it did import the rubric element and the learning-objectives. Those aren't available for the student btw, but only in the Question Manager in the *Notes* section of a question. There is no support for sections and/or assessments, though the individual items from those files are imported.

4.3   N@tschool! 7.0 UP2

Assessments, sections and questions are being storing in folders within the assessment centre of N@tschool!. The import function is easily available. The import of multiple-choice questions and multiple response questions was successful. There is no support for essay questions or fill in the blank questions. Use of HTML in the question wording and the feedback is possible, but not in the answer options. N@tschool! has only one feedback field and no support for feedback per answer option or separate feedback for incorrect and correct answers. Scores can't be stored as part of the question. In one case (QTI_MC_108b.XML) the complex structure of <respcondition> elements, using one negative score, resulted in the incorrect interpretation of the correct answer option for that question.

Special characters are being imported and displayed without a problem.

Even though N@tschool! has an entry field for tips, the hints in a QTI file aren't being imported. The content of the rubric field, learning-objectives aren't being imported.

N@tschool! can create sections and assessment, but can't import them. When you try to import a file with an assessment or a section, you'll receive a popup saying that the import was successful, even though the individual questions in those files aren't actually imported.

Though N@tschool! has extensive internal support for the use of metadata for assessments, sections and items, the metadata in the QTI files isn't imported.

4.4   Blackboard 5.5 and 6.0

Because Respondus is being used to import the QTI files into Blackboard, the remarks made in section 4.1 on page 19 are applicable here also. Questions that can be imported into Respondus can also be imported into Blackboard. Biggest difference between the two Blackboard versions is that Blackboard 6.0 has support for feedback per answer option while Blackboard 5.5.doesn't.

If the special characters are properly inserted into Respondus, then they are also imported correctly into Blackboard.

Respondus doesn't import metadata, learning-objects, rubric elements or hints. Both Blackboard versions have support for instructions and a description for an assessment, but because Respondus doesn't provide that information, they remain empty. Assessments in Blackboard 5.5 and 6 currently don't have support for metadata or sections. That means you can't group questions together with a case text.

4.5   WebCT 4

Because Respondus is being used to import the QTI files into Blackboard, the remarks made in section 4.1 on page 19 are applicable here also. Questions that can be imported into Respondus can also be imported into WebCT. If the special characters are properly inserted into Respondus, then they are also imported correctly into WebCT.

Respondus doesn't import metadata, learning-objects, rubric elements or hints. WebCT doesn't have support for that either. Assessments in WebCT currently don't have support for metadata or sections. That means you can't group questions together with a case text.

4.6   Learn eXact 1.7

As explained on page 16, the quickscan tested Learn eXact Packager in combination with QTI-Lite files instead of the original QTI files set. That also means that the results for Learn eXact like shown in Annex C on page 33 are based on the _LITE version of those files.

Learn eXact refused to import questions that don't have response processing (QTI_MC_101_LITE.XML en QTI_MR_102_LITE.XML). Though that is a strange requirement, it usually isn't a problem. The multiple choice and multiple response questions that did have response processing were imported all right. Essay questions and fill in the blank questions aren't part of the QTI Lite specifications and weren't imported by Learn eXact either. Learn eXact was the only application in the quickscan that couldn't handle HTML code at all (not even in the question wording). It is possible to import one image per answer option, the link to that image is stored in a separate media field. Special characters are being imported and displayed without problems. Metadata and hints are being ignored during import, the rubric element and learning-objectives are being imported and available while editing the question. They aren't available for the student though.

5   Summary of the results

At first glance the test results in Annex C on page 33 might suggest that it is not possible to exchange questions using QTI files. But there is a common set of basic functionalities as long as some limitations and conditions are being considered.

The next section gives an overview of the possibilities, most of them have accompanying worked out example files that show how the XML structure for the file should look. In section 5.2 the needs and wishes of the Law Online project are being discussed.

5.1   Overview of possibilities

5.1.1   Assessments, Sections and Items

None of the applications in this quickscan has support for assessments or sections. N@tschool! does have internal support for sections with for example case texts, but can't import those structures from a QTI files. Because both N@tschool! and Learn eXact are unable to extract the individual items from a file that has <assessment> or <section> elements, it is better not to use those elements. More advanced functionality, like for example the conditional display of a question, aren't supported by any of the applications in this quickscan. Looking at the list with possible functionalities from section 3.1 on page 12 that means, that for none of the functionalities in the section group (2.01 t/m 2.09) and the assessment group (3.1 t/m 3.9) there is support at this moment in any of the applications.

5.1.2   Case texts

A workaround for the use of sections to store case text is to store the case text in a separate file and then link to that file from within the question wording. The problem with that approach is that the hyperlink has a different structure for each VLE where the file might be imported afterwards. A problem that can be compared with the problem surrounding the use of images. Respondus is the only application in this quickscan that has a, though somewhat strange, workaround for that. If a QTI files uses the <mataudio> element (meant for audio), any external file (for example a HTML file with the case text) can be linked through that element. The HTML files are then imported by Respondus and transferred to Blackboard or WebCT and the hyperlink is converted to the correct format[6]. An example of such a structure is the *MC_QTI_Optimaal_04.xml* file in the test set with accompanying case text *casus.htm*. It would have made more sense to just use the <mattext> element in combination with the already available property to refer to an external file.

N@tschool! and QuestionMark Perception don't have a workaround like this.

5.1.3   More than one item in the same file

Even without the use of a <section> element it is possible to store multiple items in the same file. That is useful if you are planning to transport multiple, possibly unrelated, questions from one system to another. The structure suggested look like in the Figure on this page. N@tschool!, QuestionMark Perception and Learn eXact can import those questions into the same 'folder'. Respondus imports the question into a single Respondus file and can be transferred to Blackboard and WebCT in one go.

Questestinterop

Item

Item

Item

Item
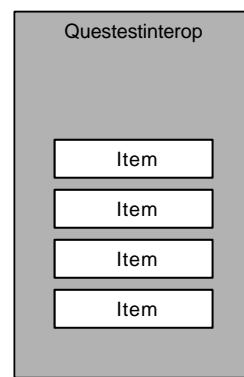
Figure 11 Multiple questions in one file

5.1.4   Multiple Choice questions

It is possible to create multiple-choice questions that are being interpreted in a consistent way within all applications of this quickscan. Use of the elements <flow></flow>, <flow_mat></flow_mat>, <flow_label></flow_label> is not advised to enable interoperability with Learn eXact. An example of such a question, without images and plain text is *MC_QTI_Optimaal_03.xml*, which can be found in the test set.

5.1.5   Multiple response questions

Multiple response questions can be constructed in a way that all applications in this quickscan can import and display them. The structure of the response processing can be a bit tricky because a too complex structure can cause problems with some of the applications. The file *MR_QTI_Optimaal_01.xml* (with HTML in the question wording and the feedback) is an example of such a question.

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[6] At the time of this quickscan, the links for Blackboard 5.5 and 6.0 weren't being converted correctly. The conversion was done to "/bin/<filename>" instead of to "content/<filename>". After modification of the link by hand, it does word. WebCT didn't have this problem. Respondus confirmed it is a bug, which will be fixed, in a next version of the application.

5.1.6 Essay questions

N@tschool! and Learn eXact don't have support for the import of essay questions. Use of that question type restricts interoperability to Blackboard, WebCT and QuestionMark Perception.
It is possible to add feedback (worked out example) for the essay question. An example of such a question can be found in the test set as *Essay_QTI_Optimaal_01.xml*.

5.1.7 Fill in the blank

Fill in the blank questions can't be imported by N@tschool! and Learn eXact. Respondus, and because of that Blackboard and WebCT, can only import fill in the blank questions with one single FIB element.
An example can be found as *FIB_QTI_Optimaal_01.xml* in the test set.

5.1.8 True/False questions

Though often looked at as a different question type, True/False questions are basically multiple-choice questions with two answer options: "True" and "False or "Yes" and "No". Because of that the remarks made for multiple-choice question in section 5.1.4 apply here also.

5.1.9 Matching questions

Matching questions were not part of this quickscan.

5.1.10 Use of hotspots in questions

The use of hotspots in questions was not part of this quickscan.

5.1.11 HTML

Only Learn eXact has no support for HTML. N@tschool! has support for HMTL in the question wording and the feedback, but not in the answer options. The other applications support HTML in the question wording, the feedback and the answer options.
In the test set, the file *MC_QTI_Optimaal_01.xml* shows how to use the HTML code in the question wording and the feedback. Learn eXact won't display that file correct though.

5.1.12 Audio, video and other objects

The use of audio, video and other objects in the question was not part of this quickscan. It is expected that the problems here are in line with what is being said for images (see 5.1.13) and case texts (see 5.1.2).

5.1.13 Images

The use of images in QTI files is somewhat of a problem. Respondus handles them ok, in both the question wording and the answer options, provided they are included using the <matimage> element. When the HTML <img> element is used, Respondus doesn't recognise them as images. When Respondus handles them images correctly, they are also being transferred to Blackboard and WebCT. QuestionMark Perception also handled the <matimage> element, but didn't show the images until they were copied to the correct folder on the hard drive by hand. QuestionMark Perception can't handle images in the answer options. N@tschool! couldn't handle the <matimage> element and aborted the import of the question text at the first occurrence of the element. N@tschool! supports images using the HTML <img> element, but doesn't import the images during the QTI import. The test set contains two files using images in the question wording. The file *MC_QTI_Optimaal_02a.xml* uses the <matimage> element while *MC_QTI_Optimaal_02b.xml* uses the <img> element in the HTML code. Biggest problem of having to use the <matimage> element is of course that no HTML editor supports that for images and that creating questions that way involves some manual conversion before being able to include it into the QTI file.

5.1.14 Feedback for items

Respondus, WebCT, Blackboard 6, Learn eXact and QuestionMark Perception support feedback per answer option for multiple-choice questions. Blackboard 5.5 and N@tschool! don't have support for feedback per answer option. The files *MR_QTI_Optimaal_01.xml* and *MC_QTI_Optimaal_01.xml* in the test set show how with only one feedback element, the feedback end up in a consistent place for all the applications. The QTI <solution> element, meant to store the correct answer, isn't supported by any of the applications.

5.1.15 Metadata for items

None of the applications in this quickscan has support for metadata for items. That is a shame because all applications do have some form of grouping or selection mechanism for the questions. It would have been nice if it had been possible to store that information in the QTI file.

5.1.16 The order of answer options for items

QTI enables you to set the order of answer options for multiple choice and multiple response questions to fixed or to random. Only N@tschool! and QuestionMark Perception have partial support for that. One thing none of the applications were able to support is a mixture of random order and fixed order, like in this example:

> Which of the following people has not yet been prime minister of the Netherlands?
> A)   Wim Kok
> B)   Ruud Lubbers
> C)   Wouter Bos
> D)   Dries van Agt
> E)   None of the above

Example 5 Multiple Choice question

Here answer options A – D are to be shown in a random order, while answer op E always should be displayed as the last answer option. This is common practice in the IMS examples and all questions in the test set use it were applicable. But as said, it is unsupported so far.

5.1.17 Response processing

In most cases response processing and scoring works ok. Though there are exceptions: Learn eXact refused the import of multiple response questions with too complex processing. QuestionMark Perception is the only application tested that knows and interprets the attribute *continue* in the <respcondition> element. Problem there is that that attribute wasn't present in the test set and it has a default value of *No*. That lead to unexpected results while processing some of the multiple response questions. For example, say a questions has five answer options (A – E), like shown here:

> Which of the following people has not yet been prime minister of the Netherlands?
> A)   Ruud Lubbers
> B)   Matt Herben
> C)   Dries van Agt
> D)   Wouter Bos
> E)   None of the above

Example 6 Multiple response question

The answer options B and D are the correct answers in this case. It is our intention to award one point for each part of the correct answer, so a maximum of two points of both B and D have been selected. If one of the other incorrect options has been selected, one point per incorrect option should be subtracted. The structure in the table below only leads to the expected result in QuestionMark Perception after `continue="Yes"` has been added to the <respcondition> element. If it isn't and someone selected the correct combination of answers (B +D) then QuestionMark Perception would stop processing the <respcondition> elements after line 7 had been reached. Being the first element of which the condition had been fulfilled. So then you would never be able to get the full amount of two points.

```
1    <respcondition continue="Yes">
2       <conditionvar>
3          <varequal respident="MR_Q01">B</varequal>
4       </conditionvar>
5       <setvar action="Add" varname="SCORE">1</setvar>
6       <displayfeedback linkrefid="FB1"/>
7    </respcondition>
8    <respcondition continue="Yes">
9       <conditionvar>
10         <varequal respident="MR_Q01">C</varequal>
11      </conditionvar>
12      <setvar action="Add" varname="SCORE">-1</setvar>
13      <displayfeedback linkrefid="FB4"/>
14   </respcondition>
15   <respcondition continue="Yes">
16      <conditionvar>
17         <varequal respident="MR_Q01">A</varequal>
18      </conditionvar>
19      <setvar action="Add" varname="SCORE">-1</setvar>
20      <displayfeedback linkrefid="FB02"/>
21   </respcondition>
22   <respcondition continue="Yes">
23      <conditionvar>
24         <varequal respident="MR_Q01">D</varequal>
25      </conditionvar>
26      <setvar action="Add" varname="SCORE">1</setvar>
27      <displayfeedback linkrefid="FB03"/>
28   </respcondition>
```

Figure 12 Response processing for multiple response questions

5.1.18 Rubric for items

Only QuestionMark Perception and Learn eXact imported the rubric elements for items. But the applications didn't store them in a place where a student could view them. That makes the use of the elements limited since they are meant for the student and would be especially useful in the VLEs Blackboard, WebCT and N@tschool!.

5.1.19 Learning-objectives for items

Only QuestionMark Perception and Learn eXact imported the learning objectives. But the applications didn't store them in a place where a student could view them. That makes the use of the elements limited since they are meant for the student and would be especially useful in the VLEs Blackboard, WebCT and N@tschool!.

5.2 project Law Online

The possibilities like described in the previous section are now compared to the requirements as determined for the project Law Online using the questionnaire in Annex A on page 28. Only the functionalities needed now immediately or in the near future will be covered in this section. Those functionalities make up the first two columns of the table in Annex A.

5.2.1 Needed functionality

Of the needed functionality on the item level, only the required support for hints can't be realised at the moment. The hints could be stored in a separate HTML and then linked like explained in section 5.1.2 on page 21, but that would mean using a QTI element for things it was never meant for.

None of the functionalities on section level were deemed necessary at the moment. On assessment level there is the need to be able to exchange complete assessment with material (for example a case text) that can be used assessment wide. Both things can be realised using QTI but aren't supported by any of the applications in this quickscan. A possible workaround would be using the option of multiple questions per file, like described in section 5.1.3 and the workaround for case text described in section 5.1.2.

5.2.2 Functionality needed soon.

For the functionality needed in the near future more problems can be foreseen. The use of multiple response questions and fill in the blank questions with feedback is no problem for Blackboard 6[7], but it limits the reusability for some of the other applications. The requested support for metadata on item level, conditional display of question on section level isn't available. At the moment there is no known workaround for this. For the requested support to be able to store learning-objectives, rubric on the assessment level, and case text on the section level, the workaround discussed in the previous section could be used.

5.2.3 Law Online example file

The QTI file that was received from the Law Online project (07-Besluitbegrip.xml) has been converted to two files (07-Besluitbegrip_V2.xml and 07-Besluitbegrip_V4.xml) that demonstrate how the case texts can be added in a way that Respondus understands them. Also, the feedback has been converted to a format understood by Respondus. These two files have been added to the test set.

5.2.4 Conclusions for the Law Online project

It looks like it is possible to fulfil the short-term requirements of the Law Online project except for a couple of smaller exceptions. For some of the workarounds it means that the interoperability of the material decreases because of that. But what use it interoperability and reusability if that means that the QTI files are not useful enough for the primary target system in the first place?

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[7] The University of Amsterdam expects to upgrade to this version in the near future.

6   Conclusions and recommendations

The feasibility of a common format to exchange, in this case test items, depends on a number of things. First, the applications need to be able to work with the format. Secondly, there need to be plenty of files, test items, available in that format. Thirdly, these items need to be of high quality, because only then teachers and course developers will be using questions developed by others.

Aim of this quickscan, like explained in section 1.1 on page 5 was to find out to what extend the applications currently being used within the consortium of *De Digitale Universiteit* a capable of working with QTI files. That answers one of the above three questions. In this chapter, the results of the quickscan will be translated into a number of conclusions and recommendations.

6.1   Conclusions

Based on the results of the quickscan, a number of conclusions have been formulated:

?? The quickscan shows that it is possible to construct a basic set of QTI questions that can be imported by all the applications that support QTI in one way or the other. As soon as more that just the basic elements of QTI are being used, one or more of the applications fail to correctly import and/or interpret the QTI files. That means there is a constant trade-off to be made between current use and reuse.

?? Because two of the VLEs used in the DU (TeleTOP and Lotus LearningSpace) and one assessment application (Testvision) can't import QTI file at the moment, storing all available items within the DU in the QTI format would mean these three applications can't use them. To ensure as wide as possible re-use of the material, adapters for these three applications should be build. That could be done in the way it is being done for Blackboard and WebCT, using an external application, or by modifying the existing applications. Respondus, which main purpose is to serve as an interface for VLEs that don't have QTI import/export capabilities shows there is a growing market for QTI support.

?? As explained in section 5.2.4, the current QTI support of Respondus 2.0 together with Blackboard 6 is sufficient to implement almost all needed functionalities of the Law Online project. That does however mean that some of those QTI files can't be used in all the other applications.

?? The quickscan has worked with the assumption that always one single QTI file, with one single QTI structure, was being used for an item. It might be better to have a central item- and assessment database which is capable of exporting the items to the different needed QTI structures.

?? The use of a test plan based on the requirements of an actual project helped to keep the needed test set as small as possible. Though not every single functionality and option of QTI has been tested, the tests were able to draw a complete enough picture of the possibilities. It also makes a bit difference whether you're trying to create a test file that can be imported in as many as possible applications, or a test file that is as complex as possible. The first goal is much harder to achieve.

6.2 Recommendations

Based on the quickscan and the conclusions in the previous sections, a number of recommendations can be made:

?? The Law Online ("Rechten Online") project isn't the only project within the DU involving the development of items and tests. It is recommended that these projects also fill in the questionnaire (Annex A) used to determine the needs of the Law Online project. Where QTI has a good enough fit it is recommended to use it so that the pool of available QTI items is a big as possible and feasible.

?? None of the applications tested in this quickscan have support for all options of the QTI specification. That itself is not a problem, but there is a need for an increase of the support because of lack of broad support for things like sections, the use of images and sound in question etcetera. The extend of influence that the DU can have on these vendors will vary. It probably will be easier for the Dutch applications, like TeleTOP, Testvision and N@tschool! than it is expected to be for Respondus, Lotus LearningSpace and QuestionMark Perception. Making these results available as widely as possible could help increase the demand by other users of the applications for better QTI support.

?? The Law Online shows that often it is a trade-off between the functionalities needed for current use and those that allow a wide as possible re-use. It is recommended to also document these choices for later reference by other projects.

?? The quickscan only researched the import possibilities of the tools and didn't take the export functionalities into account. Additional work needs to be done in that area since it is expected that there will be similar problems there.

?? A final recommendation for the DU concerns other available specifications and reference models. This quickscan was limited to the use of QTI, but with for example the IMS Contentpackaging or Learning Design specification or the ADL SCORM reference model, which are all being suggested for use within the DU, these questions regarding reusability, interoperability and feasibility are relevant. Where possible this should be done in close cooperation with other within the Netherlands and internationally.

Annex A Questionnaire project Law Online (Rechten Online)

	Functionality	Needed now	Needed soon	Needed on the long run	Won't be needing this	Don't know
1	**Items**					
1.1	use of multiple choice questions (one answer option)	X				
1.2	use of multiple response questions		X			
1.3	use of drag and drop questions					X
1.4	use of essay questions	X				
1.5	use of fill in the blank questions		X			
1.6	use of an image with hotspots			X		
1.7	use of hints in a question	X				
1.8	showing the correct answer for a question	X				
1.9	being able to have different feedback for each possible answer option		X			
1.10	being able to have feedback for correct answers		X			
1.11	being able to have feedback for incorrect answers		X			
1.12	being able to assign different scores to each answer option		X			
1.13	the use of plain text for a question and/or the feedback	X				
1.14	the use of HTML code text for a question and/or the feedback	X				
1.15	the use of images in a question and/or the feedback		X			
1.16	the use of video in a question and/or the feedback		X			
1.17	the use of audio in a question and/or the feedback		X			
1.18	the use of other objects (for example Flash) in a question and/or the feedback			X		
1.19	the use of metadata for an item		X			
1.20	the ability to store learning-objectives of a questions				X	
1.21	being able to store the rubric for an item			X		
2.	**Sections**					
2.1	use of sections		X			
2.2	being able to store learning-objectives for a section			X		
2.3	being able to store the rubric for a section			X		
2.4	being able to store text for a section		X			
2.5	being able to calculate a score for a section			X		
2.6	being able to give feedback based on the calculated score for a section			X		
2.7	being able to store metadata for a section			X		
2.8	the ability to display the questions in a random order			X		
2.9	the ability to display a question based on the answer for a previous question		X			
3.	**Assessments**					
3.1	being able to exchange assessments	X?				
3.2	being able to store learning-objectives for an assessment		X			
3.3	being able to store the rubric for an assessment		X			
3.4	being able to store text etc. that is relevant for the complete assessment	X				
3.5	being able to calculate a total score for the assessment			X		
3.6	being able to give feedback for the assessment based on the calculated total score			X		
3.7	being able to store metadata for the assessment			X		
	(continued on next page…)					

3.8	being able to have sections and/or items in an assessment displayed in random order			X		
3.9	the ability to display a question based on the answer for a previous question		X			
4.	Other remarks					

The need for functionality on section or assessment level depends on the availability of metadata on item level. If it is not possible to use that to select the items, it will be hard for the project to organize the question in a structured manner. The project has some specific issues regarding the conversion that is being done from EML to QTI.

Annex B   Content of test set

QTI file…	Plain text or HTML	Type	Rubric	Learning-objectives	Feedback	Score	Metadata	Hints	Solution	Images	Description
Items											
QTI_MC_101.XML	Plain text	Multiple Choice	N	N	N	N	N	N	N	N	Simple multiple-choice question with one correct answer, without response processing.
QTI_MC_101b.XML	Plain text	True/ False	N	N	N	N	N	N	N	N	A multiple choice question with two response choices (True/False or in this case Yes/No) and one correct answer. The question has response processing and feedback.
QTI_MR_102.XML	Plain text	Multiple response	N	N	N	N	N	N	N	N	Simple multiple response question with the correct answer consisting of multiple responses. No response processing present.
QTI_MR_102b.XML	Plain text	Multiple response	N	N	Y	Y	N	N	N	N	Based on QTI_MR_102b with added response processing, feedback and score.
QTI_Essay_104.XML	Plain text	Essay	N	N	N	N	N	N	N	N	Simple essay question.
QTI_FIB_105.XML	Plain text	Fill in the blank	N	N	N	N	N	N	N	N	Fill in the blank question with two render_fib elements
QTI_FIB_105b.XML	Plain text	Fill in the blank	N	N	N	N	N	N	N	N	Fill in the blank question with one render_fib element. Based on QTI_FIB_105.
QTI_FIB_105c.XML	Plain text	Fill in the blank	N	N	Y	Y	N	N	N	N	Based on QTI_FIB_105 with some modifications: only one render_fib element, added response processing and feedback.
QTI_MC_107.XML	Plain text	Multiple Choice	N	N	Y	Y	N	Y	N	N	Based on QTI_MC_101 with addition of hints
QTI_MC_108.XML	Plain text	Multiple Choice	N	N	Y	Y	N	N	Y	N	Multiple-choice question with the use of the 'solution' element.
QTI_MC_108b.XML	Plain text	Multiple Choice	N	N	Y	Y	N	N	Y	N	The correct answer is stored in the 'solution' element, this correct answer is also used for the feedback for incorrect choices. The correct answer is worth 2 point, answer options C is worth –1 point!
QTI_Essay_108.XML	Plain text	Essay	N	N	N	N	N	N	Y	N	Based on QTI_Essay_104 with worked out example for the essay question.
QTI_MC_109.XML	Plain text	Multiple Choice	N	N	Y	N	N	N	N	N	Added feedback for each individual answer option.
QTI_MC_110.XML	Plain text	Multiple Choice	N	N	Y	Y	N	N	N	N	
QTI_MC_111.XML	Plain text	Multiple Choice	N	N	Y	N	N	N	N	N	Based on QTI_MC_110 with these modifications: feedback for incorrect answer added. No score processing.

QTI file…	Plain text or HTML	Type	Rubric	Learning-objectives	Feedback	Score	Metadata	Hints	Solution	Images	Description
QTI_MC_111b.XML	Plain text	Multiple Choice	N	N	Y	Y	N	N	N	N	Based on QTI _MC_111, added feedback for correct answer and score processing.
QTI_MC_114.XML	HTML	Multiple Choice	N	N	N	N	N	N	N	N	Based on QTI_MC_101 with added HTML code
QTI_MC_114b.XML	HTML	Multiple Choice	Y	Y	Y	Y	N	N	N	Y	Based on QTI_MC_115, added learning-objectives and rubric
QTI_MC_115.XML	HTML	Multiple Choice	N	N	Y	Y	N	N	N	Y	Based on QTI_MC_114, added more complex HTML code (image in answer), processing of users choice (score, feedback) from QTI_MC_108 has been added, processing of incorrect choice from QTI_MC_111 has been added.
QTI_MC_119.XML	Plain text	Multiple Choice	N	N	N	N	Y	N	N	N	
QTI_MC_120.XML	Plain text	Multiple Choice	N	Y	Y	Y	N	N	N	N	Based on QTI_MC_111b, added learning-objectives
QTI_MC_121.XML	Plain text	Multiple Choice	Y	N	Y	Y	N	N	N	N	Based on QTI_MC_111b, added rubric.
Sections											
QTI_S_MC_201.XML	Plain text	Section	N	N	N	N	N	N	N	N	Simple section with two multiple-choice questions.
QTI_S_MC_202.XML	Plain text	Section	N	Y	N	N	N	N	N	N	Based on QTI_S_MC_20, added section learning-objectives.
QTI_S_MC_203.XML	Plain text	Section	Y	N	N	N	N	N	N	N	Based on QTI_S_MC_204, added rubric for section.
QTI_S_MC_204.XML	Plain text	Section	N	N	N	N	N	N	N	N	Based on QTI_S_MC_201, added text for section.
Assessment											
QTI_A_MC_301.XML	Plain text	Assessment	N	N	N	N	N	N	N	N	Simple assessment with one section with two multiple-choice questions.

For the test of Learn eXact as many as possible of the original QTI files were converted to QTI-Lite. For some, for example for the essay questions, that wasn't possible since that question type isn't supported by QTI-Lite. The converted files have been added to the test set, the filename of the converted files are the same as the original names with the suffix "_LITE" added.
This resulted in the following set of QTI-Lite files:

QTI_MC_101_LITE.XML	QTI_MC_101b_LITE.XML
QTI_MR_102_LITE.XML	QTI_MR_102b_LITE.XML
QTI_MC_107_LITE.XML	QTI_MC_108_LITE.XML
QTI_MC_108b_LITE.XML	QTI_MC_109_LITE.XML
QTI_MC_110_LITE.XML	QTI_MC_111_LITE.XML
QTI_MC_111b_LITE.XML	QTI_MC_114_LITE.XML
QTI_MC_114b_LITE.XML	QTI_MC_115_LITE.XML
QTI_MC_120_LITE.XML	QTI_MC_121_LITE.XML
QTI_S_MC_201_LITE.XML	

Annex C   Summary of the test results

	Functionality	QTI file…	Respondus 2	QuestionMark Perception 3.4	N@tschool! 7.0	Blackboard 5.5	Blackboard 6.0	WebCT 4	Learn eXact 1.7
1	**Items**								
1.01	multiple choice question (one question option)	QTI_MC_101.XML	Yes	Yes	Yes	Yes	Yes	Yes	No
		QTI_MC_110.XML	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		QTI_MC_101b.XML	Yes	Yes	Yes	Yes	Yes	Yes	Yes
1.02	use of multiple response questions	QTI_MR_102.XML	Yes	Yes	Yes	Yes	Yes	Yes	No
		QTI_MR_102b.XML	Yes	Yes	Yes	Yes	Yes	Yes	Yes
1.04	use of essay questions	QTI_Essay_104.XML	Yes	Yes	No	Yes	Yes	Yes	No
		QTI_Essay_108.XML	Partial	Partial	No	Partial	Partial	Partial	No
1.05	use of fill in the blank questions	QTI_FIB_105.XML	No	Yes	No	No	No	No	No
		QTI_FIB_105b.XML	Partial	Yes	No	Partial	Partial	Partial	No
		QTI_FIB_105c.XML	Partial	Yes	No	Partial	Partial	Partial	No
1.07	use of hints in a question	QTI_MC_107.XML	No	No	Partial	No	No	No	No
1.08	showing the correct answer for a question	QTI_MC_108.XML	Partial	Partial	Partial	Partial	Partial	Partial	Partial
		QTI_Essay_108.XML	No	No	No	No	No	No	No
		QTI_MC_109.XML	Yes	Yes	No	No	Yes	Yes	Yes
		QTI_MC_115.XML	No	No	Partial	No	No	No	No
1.09	being able to have different feedback for each possible answer option	QTI_MC_109.XML	Yes	Yes	No	No	Yes	Yes	Yes
1.10	being able to have feedback for correct answers	QTI_MC_110.XML	Yes	Yes	No	No	No	Yes	No
		QTI_MC_109.XML	Yes	Yes	No	No	Yes	Yes	Yes
		QTI_MC_115.XML	Yes	No	No	No	No	Yes	No
1.11	being able to have feedback for incorrect answers	QTI_MC_111.XML	No	No	No	No	No	No	No
		QTI_MC_111b.XML	No	No	No	No	No	No	No
		QTI_MC_109.XML	Yes	Yes	No	No	Yes	Yes	Yes
		QTI_MC_115.XML	No	No	No	No	No	No	No
1.12	being able to assign different scores to each answer option	QTI_MC_108.XML	Yes	Yes	No	Yes	Yes	Yes	Yes
		QTI_MC_108b.XML	Partial	Yes	No	Partial	Partial	Partial	No
		QTI_MC_109.XML	Yes	Yes	No	Yes	Yes	Yes	Yes
		QTI_MC_110.XML	Yes	Yes	No	Yes	Yes	Yes	Yes
		QTI_MC_111b.XML	Yes	Yes	No	Yes	Yes	Yes	Yes
		QTI_MC_115.XML	Yes	Yes	No	Yes	Yes	Yes	Yes
1.13	the use of plain text in a question of the feedback	QTI_XX_XXX.XML	Partial	Partial	Yes	Partial	Partial	Partial	Yes
1.14	the use of HTML code text for a question and/or the feedback	QTI_MC_114.XML	Yes	Yes	Partial	Yes	Yes	Yes	No
		QTI_MC_114b.XML	Yes	No	Partial	Yes	Yes	Yes	No
1.15	the use of images in a question and/or the feedback	QTI_MC_115.XML	Yes	No	No	Yes	Yes	Yes	Yes
		QTI_MC_114b.XML	Yes	No	No	Yes	Yes	Yes	No
1.19	the use of metadata for an item	QTI_MC_119.XML	No	No	No	No	No	No	No
1.20	being able to store the learning-objective of an	QTI_MC_120.XML	No	Yes	No	No	No	No	Yes

	Functionality	QTI file…	Respondus 2	QuestionMark Perception 3.4	N@tschooll 7.0	Blackboard 5.5	Blackboard 6.0	WebCT 4	Learn eXact 1.7
	item	QTI_MC_114b.XML	No	Partial	No	No	No	No	Yes
1.21	being able to store the rubric for an item	QTI_MC_121.XML	No	Yes	No	No	No	No	Yes
		QTI_MC_114b.XML	No	Partial	No	No	No	No	Yes
1.22	being able to have the answer options displayed in random order	QTI_MC_101.XML	No	Partial	Partial	No	No	No	No
2.	**Sections**								
2.01	use of sections	QTI_S_MC_201.XML	Partial	Partial	No	No	No	No	No
2.02	being able to store learning-objectives for a section	QTI_S_MC_202.XML	No	No	No	No	No	No	No
2.03	being able to store the rubric for a section	QTI_S_MC_203.XML	No	No	No	No	No	No	No
2.04	being able to store text for a section	QTI_S_MC_204.XML	No	No	No	No	No	No	No
		QTI_S_MC_203.XML	No	No	No	No	No	No	No
2.05	being able to calculate a score for a section	-	No	No	No	No	No	No	No
2.06	being able to give feedback based on the calculated score for a section	-	No	No	No	No	No	No	No
2.07	being able to store metadata for a section	-	No	No	No	No	No	No	No
2.08	the ability to display the questions in a random order	-	No	No	No	No	No	No	No
2.09	the ability to display a question based on the answer for a previous question	-	No	No	No	No	No	No	No
3.	**Assessments**								
3.1	being able to exchange assessments	QTI_A_MC_301.XML	Partial	Partial	No	No	No	No	No
3.2	being able to store learning-objectives for an assessment	-	No	No	No	No	No	No	No
3.3	being able to store the rubric for an assessment	-	No	No	No	No	No	No	No
3.4	being able to store text etc. that is relevant for the complete assessment	-	No	No	No	No	No	No	No
3.5	being able to calculate a total score for the assessment	-	No	No	No	No	No	No	No
3.6	being able to give	-	No	No	No	No	No	No	No

	Functionality	QTI file…	Respondus 2	QuestionMark Perception 3.4	N@tschool! 7.0	Blackboard 5.5	Blackboard 6.0	WebCT 4	Learn eXact 1.7
	feedback for the assessment based on the calculated total score								
3.7	being able to store metadata for the assessment	-	No	No	No	No	No	No	No
3.8	being able to have sections and/or items in an assessment displayed in random order	-	No	No	No	No	No	No	No
3.9	the ability to display a question based on the answer for a previous question	-	No	No	No	No	No	No	No

Annex D Detailed test results

Respondus 2.0.2

The test results for Respondus determine to great extend the results for both Blackboard and WebCT because Respondus is being used for the import there.

Test results Respondus 2.02

		Functionality	QTI file...	Import?	Comments
1		Items			
1.01		use of multiple choice questions (one answer option)	QTI_MC_101.XML	Yes	Note: Respondus assumes that each question has a correct answer. For QTI_MC_101.XML that information isn't present in the file. Respondus chooses the first answer option as the correct one, even when that isn't the case.
			QTI_MC_110.XML	Yes	
			QTI_MC_101b.XML	Yes	
			QTI_MC_XXX.XML	N/A	For the results of all XXX files, see their specific test results.
1.02		use of multiple response questions	QTI_MR_102.XML	Yes	After modifying the question in Respondus, you have to enter the score. The fact that that info isn't in the QTI file isn't a problem here (unlike with the MC question).
			QTI_MR_102b.XML	Yes	
1.03		use of drag and drop questions	-	-	
1.04		use of essay questions	QTI_Essay_104.XML	Yes	
			QTI_Essay_108.XML	Partial	The solution element wasn't imported.
1.05		use of fill in the blank questions	QTI_FIB_105.XML	No	Though Respondus can handle "fill in the blank" questions, it wasn't able to import this file. A short test revealed that Respondus could only handle FIB with one single FIB element.
			QTI_FIB_105b.XML	Partial	Respondus imported the question, but ignored all text after the FIB element.
			QTI_FIB_105c.XML	Partial	Respondus imported the question, but ignored all text after the FIB element.
1.06		use of hot spot questions	-	-	
1.07		use of hints in a question	QTI_MC_107.XML	No	The information is no longer available after the import.

Test results Respondus 2.02

		Functionality	**QTI file...**	**Import?**	**Comments**
1.08		showing the correct answer for a question	QTI_MC_108.XML	Partial	The contents of the <solution> element wasn't imported.
			QTI_Essay_108.XML	No	The worked out example wasn't imported.
			QTI_MC_109.XML	Yes	All answer options have feedback.
			QTI_MC_115.XML	No	The contents of the <solution> element wasn't imported, instead the feedback for the incorrect answer was imported as 'general feedback'.
1.09		being able to have different feedback for each possible answer option	QTI_MC_109.XML	Yes	This is the way Respondus works.
1.10		being able to have feedback for correct answers	QTI_MC_110.XML	Yes	The feedback is imported as answer option specific feedback for the correct answer.
			QTI_MC_109.XML	Yes	All answer options have feedback.
			QTI_MC_115.XML	Yes	The feedback is imported as answer option specific feedback for the correct answer.
1.11		being able to have feedback for incorrect answers	QTI_MC_111.XML	No	The feedback for the incorrect answer was stored as 'general feedback'.
			QTI_MC_111b.XML	No	The feedback for the incorrect answer was stored as 'general feedback'.
			QTI_MC_109.XML	Yes	Because the incorrect answer options also have their own feedback.
			QTI_MC_115.XML	No	The feedback for the incorrect answer was stored as 'general feedback'.
1.12		being able to assign different scores to each answer option	QTI_MC_108.XML	Yes	
			QTI_MC_108b.XML	Partial	In Respondus only the score for the correct answer is imported and not the (negative) score for the incorrect answer.
			QTI_MC_109.XML	Yes	
			QTI_MC_110.XML	Yes	
			QTI_MC_111b.XML	Yes	
			QTI_MC_115.XML	Yes	
1.13		the use of plain text for a question and/or the feedback	QTI_XX_XXX.XML	Partial	Special characters like "é", "ë" are not being imported properly for plain text questions.
1.14		the use of HTML code text for a question and/or the feedback	QTI_MC_114.XML	Yes	If you want to edit the question, Respondus indicate it contains complex HTML code.
			QTI_MC_114b.XML	Yes	

Test results Respondus 2.02

		Functionality	**QTI file...**	**Import?**	**Comments**
1.15		the use of images in a question and/or the feedback	QTI_MC_115.XML	Yes	During im port of the questions Respondus asks for the folder containing the images used.
			QTI_MC_114b.XML	Yes	Note, because the <solution> element wasn't imported, the image used in there wasn't displayed naturally.
1.16		the use of video in a question and/or the feedback	-	-	
1.17		the use of audio in a question and/or the feedback	-	-	
1.18		the use of other objects (for example Flash) in a question and/or the feedback	-	-	
1.19		the use of metadata for an item	QTI_MC_119.XML	No	
1.20		being able to store the learning-objective of an item	QTI_MC_120.XML	No	
			QTI_MC_114b.XML	No	
1.21		being able to store the rubric for an item	QTI_MC_121.XML	No	
			QTI_MC_114b.XML	No	
1.22		being able to have the answer options displayed in random order	QTI_MC_101.XML	No	Order is fixed to the order in the QTI files.
			QTI_MC_XXX.XML	No	
2.		Sections			
2.01		use of sections	QTI_S_MC_201.XML	Partial	Respondus imports the items out of the section, all other section specific information is lost. As a result of that the answers to all following questions are also 'No'
2.02		being able to store learning-objectives for a section	QTI_S_MC_202.XML	No	
2.03		being able to store the rubric for a section	QTI_S_MC_203.XML	No	
2.04		being able to store text for a section	QTI_S_MC_204.XML	No	
			QTI_S_MC_203.XML	No	
2.05		being able to calculate a score for a section	-	No	
2.06		being able to give feedback based on the calculated score for a section	-	No	
2.07		being able to store metadata for a section	-	No	
2.08		the ability to display the questions in a random order	-	No	
2.09		the ability to display a question based on the answer for a previous question. (continued on next page…)	-	No	

Test results Respondus 2.02

		Functionality	QTI file...	Import?	Comments
3.		Assessments			
3.1		being able to exchange assessments	QTI_A_MC_301.XML	Partial	Respondus imports the items out of the sections in the assessment, all other section specific and assessment specific information is lost. As a result of that the answers to all following questions are also 'No'
3.2		being able to store learning-objectives for an assessment	-	No	
3.3		being able to store the rubric for an assessment	-	No	
3.4		being able to store text etc. that is relevant for the complete assessment	-	No	
3.5		being able to calculate a total score for the assessment	-	No	
3.6		being able to give feedback for the assessment based on the calculated total score	-	No	
3.7		being able to store metadata for the assessment	-	No	
3.8		being able to have sections and/or items in an assessment displayed in random order	-	No	
3.9		the ability to display a question based on the answer for a previous question	-	No	

QuestionMark Perception 3.4.0.2

The following table contains the detailed test results for QuestionMark Perception 3.4.0.2

Test results QuestionMark Perception 3.4.0.2

	Functionality	**QTI file...**	**Import ?**	**Comments**
1	**Items**			
1.01	use of multiple choice questions (one answer option)	QTI_MC_101.XML	Yes	No 'correct' answer is selected (which is good).
		QTI_MC_110.XML	Yes	
		QTI_MC_101b.XML	Yes	
		QTI_MC_XXX.XML	N/A	For the results of all XXX files, see their specific test results.
1.02	use of multiple response questions	QTI_MR_102.XML	Yes	
		QTI_MR_102b.XML	Yes	Feedback was show for the correct combination of answers.
1.03	use of drag and drop questions	-	-	
1.04	use of essay questions	QTI_Essay_104.XML	Yes	
		QTI_Essay_108.XML	Partial	The worked out answer is being ignored.
1.05	use of fill in the blank questions	QTI_FIB_105.XML	Yes	Both FIB elements are being displayed.
		QTI_FIB_105b.XML	Yes	
		QTI_FIB_105c.XML	Yes	Feedback also worked.
1.06	use of hot spot questions	-	-	
1.07	use of hints in a question	QTI_MC_107.XML	No	The Hint element wasn't imported.
1.08	showing the correct answer for a question	QTI_MC_108.XML	Partial	The <solution> element is being ignored, as feedback the feedback for the correct answer is being used.
		QTI_Essay_108.XML	No	The worked out answer is being ignored.
		QTI_MC_109.XML	Yes	QMP supports feedback per answer option.
		QTI_MC_115.XML	N/A	Unable to determine because the answer options (with HTML and images) weren't displayed.
1.09	being able to have different feedback for each possible answer option	QTI_MC_109.XML	Yes	QMP supports feedback per answer option.
1.10	being able to have feedback for correct answers	QTI_MC_110.XML	Yes	
		QTI_MC_109.XML	Yes	QMP supports feedback per answer option.
		QTI_MC_115.XML	N/A	Unable to determine because the answer options (with HTML and images) weren't displayed.

Test results QuestionMark Perception 3.4.0.2

		Functionality	**QTI file...**	**Import ?**	**Comments**
1.11		being able to have feedback for incorrect answers	QTI_MC_111.XML	No	The feedback isn't being imported.
			QTI_MC_111b.XML	No	The feedback is being imported but is being misinterpreted.
			QTI_MC_109.XML	Yes	QMP supports feedback per answer option.
			QTI_MC_115.XML	N/A	Unable to determine because the answer option (with HTML and images) weren't displayed.
1.12		being able to assign different scores to each answer option	QTI_MC_108.XML	Yes	
			QTI_MC_108b.XML	Yes	Even the negative score is imported.
			QTI_MC_109.XML	Yes	
			QTI_MC_110.XML	Yes	
			QTI_MC_111b.XML	Yes	
			QTI_MC_115.XML	Yes	Even though the question use useless because the HTML isn't displayed.
1.13		the use of plain text for a question and/or the feedback	QTI_XX_XXX.XML	Partial	Special characters like ë and é aren't being imported correctly.
1.14		the use of HTML code text for a question and/or the feedback	QTI_MC_114.XML	Yes	
			QTI_MC_114b.XML	No	The images cause the answer options to not be displayed.
1.15		the use of images in a question and/or the feedback	QTI_MC_115.XML	No	The answer options are not being displayed.
			QTI_MC_114b.XML	No	The answer options are not being displayed.
1.16		the use of video in a question and/or the feedback	-	-	
1.17		the use of audio in a question and/or the feedback	-	-	
1.18		the use of other objects (for example Flash) in a question and/or the feedback	-	-	
1.19		the use of metadata for an item	QTI_MC_119.XML	No	
1.20		being able to store the learning-objective of an item	QTI_MC_120.XML	Yes	The learning-objectives can be retrieved from the Question Manager (edit question)
			QTI_MC_114b.XML	Partial	The learning-objectives can be retrieved from the Question Manager (edit question). The HTML code is visible and isn't interpreted.
1.21		being able to store the rubric for an item	QTI_MC_121.XML	Yes	Not displayed, though they are imported and can be retrieved in the Question Manager (edit question).
			QTI_MC_114b.XML	Partial	Not displayed, though they are imported and can be retrieved in the Question Manager (edit question). The HTML code is shown and not interpreted.

Test results QuestionMark Perception 3.4.0.2

		Functionality	**QTI file...**	**Import ?**	**Comments**
1.22		being able to have the answer options displayed in random order	QTI_MC_101.XML	Partial	Either all fixed or all random, not like in the file. QMP **can** do that, but it isn't imported from the file.
			QTI_MC_XXX.XML	Partial	
2.		**Sections**			
2.01		use of sections	QTI_S_MC_201.XML	Partial	The items out of the section are being imported, all other section specific information is lost. As a result of that the answers to all following questions are also 'No'.
2.02		being able to store learning-objectives for a section	QTI_S_MC_202.XML	No	
2.03		being able to store the rubric for a section	QTI_S_MC_203.XML	No	
2.04		being able to store text for a section	QTI_S_MC_204.XML	No	
			QTI_S_MC_203.XML	No	
2.05		being able to calculate a score for a section	-	No	
2.06		being able to give feedback based on the calculated score for a section	-	No	
2.07		being able to store metadata for a section	-	No	
2.08		the ability to display the questions in a random order	-	No	
2.09		the ability to display a question based on the answer for a previous question	-	No	
3.		**Assessments**			
3.1		being able to exchange assessments	QTI_A_MC_301.XML	Partial	The items out of the assessment are being imported, all other section and assessment specific information is lost. As a result of that the answers to all following questions are also 'No'.
3.2		being able to store learning-objectives for an assessment	-	No	
3.3		being able to store the rubric for an assessment	-	No	
3.4		being able to store text etc. that is relevant for the complete assessment	-	No	
3.5		being able to calculate a total score for the assessment	-	No	
3.6		being able to give feedback for the assessment based on the calculated total score	-	No	
3.7		being able to store metadata for the assessment	-	No	
3.8		being able to have sections and/or items in an assessment displayed in random order	-	No	
3.9		the ability to display a question based on the answer for a previous question	-	No	

N@tschool! 7.0 UP2

Test results N@tschool! 7.0 UP2

		Functionality	**QTI file...**	**Import ?**	**Comments**
1		**Items**			
1.01		use of multiple choice questions (one answer option)	QTI_MC_101.XML	Yes	No 'correct' answer is being selected (which is good).
			QTI_MC_110.XML	Yes	
			QTI_MC_101b.XML	Yes	
			QTI_MC_XXX.XML	N/A	For the results of all XXX files, see their specific test results.
1.02		use of multiple response questions	QTI_MR_102.XML	Yes	
			QTI_MR_102b.XML	Yes	
1.03		use of drag and drop questions	-	-	
1.04		use of essay questions	QTI_Essay_104.XML	No	No support for it in NS
			QTI_Essay_108.XML	No	No support for it in NS
1.05		use of fill in the blank questions	QTI_FIB_105.XML	No	Import failed
			QTI_FIB_105b.XML	No	Import failed
			QTI_FIB_105c.XML	No	Import failed
1.06		use of hot spot questions	-	-	
1.07		use of hints in a question	QTI_MC_107.XML	Partial	The hint is imported as feedback.
1.08		showing the correct answer for a question	QTI_MC_108.XML	Partial	The <solution> element isn't imported. As feedback, the feedback for the correct answer is being used.
			QTI_Essay_108.XML	No	No support for import of essay questions.
			QTI_MC_109.XML	No	NS doesn't support feedback per answer option. In this case the chosen feedback is strange.
			QTI_MC_115.XML	Partial	The <solution> element isn't being used. In the feedback, the feedback for the correct answer is being used.
1.09		being able to have different feedback for each possible answer option	QTI_MC_109.XML	No	NS doesn't support feedback per answer option.
1.10		being able to have feedback for correct answers	QTI_MC_110.XML	No	NS doesn't support feedback per answer option.
			QTI_MC_109.XML	No	NS doesn't support feedback per answer option.
			QTI_MC_115.XML	No	NS doesn't support feedback per answer option.
1.11		being able to have feedback for incorrect answers	QTI_MC_111.XML	No	NS doesn't support feedback per answer option.
			QTI_MC_111b.XML	No	NS doesn't support feedback per answer option.
			QTI_MC_109.XML	No	NS doesn't support feedback per answer option.
			QTI_MC_115.XML	No	NS doesn't support feedback per answer option.

Test results N@tschool! 7.0 UP2

		Functionality	QTI file...	Import ?	Comments
1.12		being able to assign different scores to each answer option	QTI_MC_108.XML	No	NS doesn't store scores for items.
			QTI_MC_108b.XML	No	The combination of positive and negative scores causes NS to select the incorrect answer option as the correct option!
			QTI_MC_109.XML	No	
			QTI_MC_110.XML	No	
			QTI_MC_111b.XML	No	
			QTI_MC_115.XML	No	
1.13		the use of plain text for a question and/or the feedback	QTI_XX_XXX.XML	Yes	Special characters are being interpreted correctly.
1.14		the use of HTML code text for a question and/or the feedback	QTI_MC_114.XML	Partial	For QTI import, only in the question wording and the feedback, not in the answer options.
			QTI_MC_114b.XML	Partial	Not in the answer options.
1.15		the use of images in a question and/or the feedback	QTI_MC_115.XML	No	This question only had images in the answer options. NS doesn't support that.
			QTI_MC_114b.XML	No	This question only had images in the answer options. NS doesn't support that.
1.16		the use of video in a question and/or the feedback	-	-	
1.17		the use of audio in a question and/or the feedback	-	-	
1.18		the use of other objects (for example Flash) in a question and/or the feedback	-	-	
1.19		the use of metadata for an item	QTI_MC_119.XML	No	
1.20		being able to store the learning-objective of an item	QTI_MC_120.XML	No	No support for it in NS
			QTI_MC_114b.XML	No	No support for it in NS
1.21		being able to store the rubric for an item	QTI_MC_121.XML	No	No support for it in NS
			QTI_MC_114b.XML	No	No support for it in NS
1.22		being able to have the answer options displayed in random order	QTI_MC_101.XML	Partial	Either all fixed or all random, not like in the file.
			QTI_MC_XXX.XML	Partial	Either all fixed or all random, not like in the file.
2.		Sections			
2.01		use of sections	QTI_S_MC_201.XML	No	Despite the 'im port successful' message, no items were imported. As a result all other answers for sections are 'No'
2.02		being able to store learning-objectives for a section	QTI_S_MC_202.XML	No	
2.03		being able to store the rubric for a section	QTI_S_MC_203.XML	No	
2.04		being able to store text for a section	QTI_S_MC_204.XML	No	
			QTI_S_MC_203.XML	No	

Test results N@tschool! 7.0 UP2

		Functionality	**QTI file...**	**Import ?**	**Comments**
2.05		being able to calculate a score for a section	-	No	
2.06		being able to give feedback based on the calculated score for a section	-	No	
2.07		being able to store metadata for a section	-	No	
2.08		the ability to display the questions in a random order	-	No	
2.09		the ability to display a question based on the answer for a previous question	-	No	
3.		Assessments			
3.1		being able to exchange assessments	QTI_A_MC_301.XML	No	Despite the 'import successful' message, no items were imported. As a result all other answers for assessments are 'No'
3.2		being able to store learning-objectives for an assessment	-	No	
3.3		being able to store the rubric for an assessment	-	No	
3.4		being able to store text etc. that is relevant for the complete assessment	-	No	
3.5		being able to calculate a total score for the assessment	-	No	
3.6		being able to give feedback for the assessment based on the calculated total score	-	No	
3.7		being able to store metadata for the assessment	-	No	
3.8		being able to have sections and/or items in an assessment displayed in random order	-	No	
3.9		the ability to display a question based on the answer for a previous question	-	No	

Blackboard 5.5 en 6.0

This table gives an overview of the test results for Blackboard 5.5 and 6.0.
Because Respondus 2.0 is being used to import the questions into Blackboard, the results for that test to great extent determine the results for this Blackboard test. The results for Blackboard 5.5 and 6.0 have been aggregated into one table because in only one case, the support for feedback per answer options, there was a difference in support between the two versions.

Test results Blackboard 5.5 and 6.0

		Functionality	QTI file...	Import ?	Comments
1		Items			
1.01		use of multiple choice questions (one answer option)	QTI_MC_101.XML	Yes	Because Respondus incorrectly assumes there always is a correct answer, even if that information isn't present in the QTI file, that possibly incorrect information is also transferred into Blackboard.
			QTI_MC_110.XML	Yes	
			QTI_MC_101b.XML	Yes	
			QTI_MC_XXX.XML	N/A	For the results of all XXX files, see their specific test results.
1.02		use of multiple response questions	QTI_MR_102.XML	Yes	
			QTI_MR_102b.XML	Yes	
1.03		use of drag and drop questions	-	-	
1.04		use of essay questions	QTI_Essay_104.XML	Yes	
			QTI_Essay_108.XML	Partial	The worked out example wasn't imported by Respondus and thus wasn't available in Blackboard.
1.05		use of fill in the blank questions	QTI_FIB_105.XML	No	No support in Respondus for this file.
			QTI_FIB_105b.XML	Partial	Since Respondus ignored the text after the FIB element, that information wasn't transferred to BB either.
			QTI_FIB_105c.XML	Partial	To the extend that Respondus managed to import the question.
1.06		use of hot spot questions	-	-	
1.07		use of hints in a question	QTI_MC_107.XML	No	No support in Respondus for hints.
1.08		showing the correct answer for a question	QTI_MC_108.XML	Partial	Since Respondus didn't import the contents of the <solution> element, it wasn't available in BB either.
			QTI_Essay_108.XML	No	The worked out example wasn't imported by Respondus and thus wasn't available in Blackboard.

Test results Blackboard 5.5 and 6.0

		Functionality	QTI file...	Import ?	Comments
			QTI_MC_109.XML	No (5.5) Yes (6.0)	Respondus can import feedback per answer option. BB 5.5 doesn't support that while BB 6.0 does..
			QTI_MC_115.XML	No	The contents of the <solution> element wasn't imported, instead the feedback for the incorrect answer was used as the 'general feedback'.
1.09		being able to have different feedback for each possible answer option	QTI_MC_109.XML	No (5.5) Yes (6.0)	No support in BB 5.5 Supported by 6.0.
1.10		being able to have feedback for correct answers	QTI_MC_110.XML	No	This is a Respondus problem
			QTI_MC_109.XML	No	
			QTI_MC_115.XML	No	
1.11		being able to have feedback for incorrect answers	QTI_MC_111.XML	No	
			QTI_MC_111b.XML	No	
			QTI_MC_109.XML	No	
			QTI_MC_115.XML	No	
1.12		being able to assign different scores to each answer option	QTI_MC_108.XML	Yes	
			QTI_MC_108b.XML	Partial	BB supports only one single score for the correct answer for a question.
			QTI_MC_109.XML	Yes	
			QTI_MC_110.XML	Yes	
			QTI_MC_111b.XML	Yes	
			QTI_MC_115.XML	Yes	
1.13		the use of plain text for a question and/or the feedback	QTI_XX_XXX.XML	Partial	Because special characters like "é", "ë" in plain text aren't being imported correctly in Respondus, they also aren't imported correctly into BB.
1.14		the use of HTML code text for a question and/or the feedback	QTI_MC_114.XML	Yes	
			QTI_MC_114b.XML	Yes	
1.15		the use of images in a question and/or the feedback	QTI_MC_115.XML	Yes	Respondus uploads the images to BB and changes the links to the correct location in BB.
			QTI_MC_114b.XML	Yes	Note: because the <solution> element isn't imported, the image in that element of course isn't displayed either.
1.16		the use of video in a question and/or the feedback	-	-	
1.17		the use of audio in a question and/or the feedback	-	-	
1.18		the use of other objects (for example Flash) in a question and/or the feedback	-	-	
1.19		the use of metadata for an item	QTI_MC_119.XML	No	
1.20		being able to store the learning-objective of an item	QTI_MC_120.XML	No	Not supported by Respondus
			QTI_MC_114b.XML	No	Not supported by Respondus

Test results Blackboard 5.5 and 6.0

	Functionality	**QTI file...**	**Import ?**	**Comments**
1.21	being able to store the rubric for an item	QTI_MC_121.XML	No	Not supported by Respondus
		QTI_MC_114b.XML	No	Not supported by Respondus
1.22	being able to have the answer options displayed in random order	QTI_MC_101.XML	No	Order Respondus is fixed, identical to the order in the QTI file.
		QTI_MC_XXX.XML	No	
2.	**Sections**			
2.01	use of sections	QTI_S_MC_201.XML	No	Respondus doesn't support import of QTI sections. Section specific information is lost, only the items are being imported. Because of that the answer to the following section related questions is 'No' also.
2.02	being able to store learning-objectives for a section	QTI_S_MC_202.XML	No	
2.03	being able to store the rubric for a section	QTI_S_MC_203.XML	No	
2.04	being able to store text for a section	QTI_S_MC_204.XML	No	
		QTI_S_MC_203.XML	No	
2.05	being able to calculate a score for a section	-	No	
2.06	being able to give feedback based on the calculated score for a section	-	No	
2.07	being able to store metadata for a section	-	No	
2.08	the ability to display the questions in a random order	-	No	
2.09	the ability to display a question based on the answer for a previous question	-	No	
3.	**Assessments**			
3.1	being able to exchange assessments	QTI_A_MC_301.XML	No	Respondus doesn't support import of QTI assessments or sections. Assessment and Section specific information is lost, only the items are being imported. Because of that the answer to the following assessment related questions is 'No' also.
3.2	being able to store learning-objectives for an assessment	-	No	
3.3	being able to store the rubric for an assessment	-	No	
3.4	being able to store text etc. that is relevant for the complete assessment	-	No	
3.5	being able to calculate a total score for the assessment	-	No	
3.6	being able to give feedback for the assessment based on the calculated total score	-	No	

Test results Blackboard 5.5 and 6.0

		Functionality	**QTI file...**	**Import ?**	**Comments**
3.7		being able to store metadata for the assessment	-	No	
3.8		being able to have sections and/or items in an assessment displayed in random order	-	No	
3.9		the ability to display a question based on the answer for a previous question	-	No	

WebCT 4

This section describes the test results for WebCT 4 in combination with Respondus 2.0. That also means that support is limited to what Respondus 2.0 can support.

Test results WebCT 4

	Functionality	QTI file...	Import ?	Comments
1	Items			
1.01	use of multiple choice questions (one answer option)	QTI_MC_101.XML	Yes	Because Respondus incorrectly assumes there always is a correct answer, even if that information isn't present in the QTI file, that possibly incorrect information is also transferred into WebCT.
		QTI_MC_110.XML	Yes	
		QTI_MC_101b.XML	Yes	
1.02	use of multiple response questions	QTI_MR_102.XML	Yes	
		QTI_MR_102b.XML	Yes	
1.03	use of drag and drop questions	-		
1.04	use of essay questions	QTI_Essay_104.XML	Yes	
		QTI_Essay_108.XML	Partial	Respondus didn't import the worked out example.
1.05	use of fill in the blank questions	QTI_FIB_105.XML	No	Not supported by Respondus.
		QTI_FIB_105b.XML	Partial	Since Respondus ignored the text after the FIB element, that information wasn't transferred to WebCT either.
		QTI_FIB_105c.XML	Partial	Since Respondus ignored the text after the FIB element, that information wasn't transferred either.
1.06	use of hot spot questions	-	-	
1.07	use of hints in a question	QTI_MC_107.XML	No	No support in Respondus for this file.
1.08	showing the correct answer for a question	QTI_MC_108.XML	Partial	Since Respondus didn't import the contents of the <solution> element, it wasn't available in WebCT either.
		QTI_Essay_108.XML	No	The worked out example wasn't imported by Respondus and thus wasn't available in WebCT.
		QTI_MC_109.XML	Yes	Respondus can import feedback per answer option. WebCT also supports that.
		QTI_MC_115.XML	No	The contents of the <solution> element wasn't imported, instead the feedback for the incorrect answer was used as the 'general feedback'.
1.09	being able to have different feedback for each possible answer option	QTI_MC_109.XML	Yes	
1.10	being able to have feedback for correct answers	QTI_MC_110.XML	Yes	The feedback is imported as answer specific for the correct answer.

Test results WebCT 4

		Functionality	QTI file...	Import ?	Comments
			QTI_MC_109.XML	Yes	All answer options have feedback.
			QTI_MC_115.XML	Yes	The feedback is imported as answer specific for the correct answer.
1.11		being able to have feedback for incorrect answers	QTI_MC_111.XML	No	The feedback for the incorrect answer is being imported as 'general feedback' by Respondus and thus in WebCT.
			QTI_MC_111b.XML	No	The feedback for the incorrect answer is being imported as 'general feedback' by Respondus and thus in WebCT.
			QTI_MC_109.XML	Yes	Because all options have their own feedback.
			QTI_MC_115.XML	No	The feedback for the incorrect answer is being imported as 'general feedback' by Respondus and thus in WebCT.
1.12		being able to assign different scores to each answer option	QTI_MC_108.XML	Yes	
			QTI_MC_108b.XML	Partial	Respondus only imports the score for the correct answer, not the negative score for the incorrect answer. Thus not present in WebCT.
			QTI_MC_109.XML	Yes	
			QTI_MC_110.XML	Yes	
			QTI_MC_111b.XML	Yes	
			QTI_MC_115.XML	Yes	
1.13		the use of plain text for a question and/or the feedback	QTI_XX_XXX.XML	Partial	Because special characters like "é", "ë" in plain text aren't being imported correctly in Respondus, they also aren't imported correctly into WebCT.
1.14		the use of HTML code text for a question and/or the feedback	QTI_MC_114.XML	Yes	
			QTI_MC_114b.XML	Yes	
1.15		the use of images in a question and/or the feedback	QTI_MC_115.XML	Yes	Imported correctly by Respondus and transferred successfully to WebCT.
			QTI_MC_114b.XML	Yes	Note: because the <solution> element isn't imported, the image in that element of course isn't displayed either.
1.16		the use of video in a question and/or the feedback	-	-	
1.17		the use of audio in a question and/or the feedback	-	-	
1.18		the use of other objects (for example Flash) in a question and/or the feedback	-	-	
1.19		the use of metadata for an item	QTI_MC_119.XML	No	

Test results WebCT 4

		Functionality	**QTI file...**	**Import ?**	**Comments**
1.20		being able to store the learning-objective of an item	QTI_MC_120.XML	No	Not supported by Respondus
			QTI_MC_114b.XML	No	Not supported by Respondus
1.21		being able to store the rubric for an item	QTI_MC_121.XML	No	Not supported by Respondus
			QTI_MC_114b.XML	No	Not supported by Respondus
1.22		being able to have the answer options displayed in random order	QTI_MC_101.XML	No	Order Respondus is fixed, identical to the order in the QTI file.
			QTI_MC_XXX.XML	No	Order Respondus is fixed, identical to the order in the QTI file.
2.	**Sections**				
2.01		use of sections	QTI_S_MC_201.XML	No	Respondus doesn't support import of QTI sections. Section specific information is lost, only the items are being imported. Because of that the answer to the following section related questions is 'No' also.
2.02		being able to store learning-objectives for a section	QTI_S_MC_202.XML	No	
2.03		being able to store the rubric for a section	QTI_S_MC_203.XML	No	
2.04		being able to store text for a section	QTI_S_MC_204.XML	No	
			QTI_S_MC_203.XML	No	
2.05		being able to calculate a score for a section	-	No	
2.06		being able to give feedback based on the calculated score for a section	-	No	
2.07		being able to store metadata for a section	-	No	
2.08		the ability to display the questions in a random order	-	No	
2.09		the ability to display a question based on the answer for a previous question	-	No	
3.	**Assessments**				
3.1		being able to exchange assessments	QTI_A_MC_301.XML	No	Respondus doesn't support import of QTI assessments or sections. Assessment and Section specific information is lost, only the items are being imported. Because of that the answer to the following assessment related questions is 'No' also.
3.2		being able to store learning-objectives for an assessment	-	No	
3.3		being able to store the rubric for an assessment	-	No	
3.4		being able to store text etc. that is relevant for the complete assessment	-	No	

Test results WebCT 4

		Functionality	QTI file...	Import ?	Comments
3.5		being able to calculate a total score for the assessment	-	No	
3.6		being able to give feedback for the assessment based on the calculated total score	-	No	
3.7		being able to store metadata for the assessment	-	No	
3.8		being able to have sections and/or items in an assessment displayed in random order	-	No	
3.9		the ability to display a question based on the answer for a previous question	-	No	

Learn eXact 1.7

This table contains the results for the tests using Learn eXact 1.7.83.5
Learn eXact doesn't support QTI, but QTI-LITE. That caused problems with all the files of the existing test set. because QTI-LITE doesn't support the <flow>, <flow_mat>, <flow_label> elements which were being used in all the files. The test has been conducted with the converted "_LITE" versions of the files.

Test results Learn eXact 1.7

|	**Functionality**	**QTI file...**	**Import ?**	**Comments**
1	**Items**			
1.01	use of multiple choice questions (one answer option)	QTI_MC_101_LITE.XML	No	Because there was no <reprosessing> element Learn eXact refused to import the file (`Warning: The item "QTI_MC_101_LITE" cannot be imported because it doesn't contain any Reprocessing`)
		QTI_MC_110.XML	Yes	
		QTI_MC_101b.XML	Yes	
1.02	use of multiple response questions	QTI_MR_102_LITE.XML	No	Because there was no <reprosessing> element
		QTI_MR_102b_LITE.XML	Yes	
1.03	use of drag and drop questions	-	-	
1.04	use of essay questions	-	No	Not supported by QTI-LITE, no internal support.
1.05	use of fill in the blank questions	-	No	Not supported by QTI-LITE, no internal support.
1.06	use of hot spot questions	-	-	
1.07	use of hints in a question	QTI_MC_107_LITE.XML	No	Not supported by QTI-LITE, no internal support. Also not supported because of the lacking <reprosessing> element.
1.08	showing the correct answer for a question	QTI_MC_108_LITE.XML	Partial	The <solution> element was not imported
		QTI_MC_109_LITE.XML	Yes	Each answer option has feedback.
		QTI_MC_115_LITE.XML	No	The content of the <solution> element was not imported. Instead the feedback for the incorrect answer is being used as feedback for 'Correct Response Feedback'.
1.09	being able to have different feedback for each possible answer option	QTI_MC_109_LITE.XML	Yes	
	(continued on next page…)			

Test results Learn eXact 1.7

		Functionality	**QTI file...**	**Import ?**	**Comments**
1.10		being able to have feedback for correct answers	QTI_MC_110_LITE.XML	Yes	
			QTI_MC_109_LITE.XML	Yes	All answer options have feedback.
			QTI_MC_115_LITE.XML	No	The content of the <solution> element was not imported. Instead the feedback for the incorrect answer is being used as feedback for 'Correct Response Feedback'.
1.11		being able to have feedback for incorrect answers	QTI_MC_111_LITE.XML	No	The feedback for the incorrect answer is being used as feedback for 'Correct Response Feedback'.
			QTI_MC_111b_LITE.XML	No	The feedback for the incorrect answer is being used as feedback for 'Correct Response Feedback' and vice versa.
			QTI_MC_109_LITE.XML	Yes	All answer options have feedback.
			QTI_MC_115_LITE.XML	No	The feedback for the incorrect answer is being used as feedback for 'Correct Response Feedback' and vice versa.
1.12		being able to assign different scores to each answer option	QTI_MC_108_LITE.XML	Yes	
			QTI_MC_108b_LITE.XML	No	Neither of the scores was imported.
			QTI_MC_109_LITE.XML	Yes	
			QTI_MC_110_LITE.XML	Yes	
			QTI_MC_111b_LITE.XML	Yes	
			QTI_MC_115_LITE.XML	Yes	
1.13		the use of plain text for a question and/or the feedback	QTI_XX_XXX_LITE.XML	Yes	Even special characters like "é", "ë" are being imported correctly.
1.14		the use of HTML code text for a question and/or the feedback	QTI_MC_114_LITE.XML	No	Import not possible because of lacking <reprosessing>
			QTI_MC_114b_LITE.XML	Partial	The HTML code is imported, but not rendered.
1.15		the use of images in a question and/or the feedback	QTI_MC_115_LITE.XML	Yes	
			QTI_MC_114b_LITE.XML	No	The HTML code is not rendered correctly, only three of the four images is being displayed.
1.16		the use of video in a question and/or the feedback	-	-	
1.17		the use of audio in a question and/or the feedback	-	-	
1.18		the use of other objects (for example Flash) in a question and/or the feedback	-	-	
1.19		the use of metadata for an item	QTI_MC_119_LITE.XML	No	
1.20		being able to store the learning-objective of an item	QTI_MC_120_LITE.XML	Yes	
			QTI_MC_114b_LITE.XML	Yes	
1.21		being able to store the rubric for an item	QTI_MC_121_LITE.XML	Yes	
			QTI_MC_114b_LITE.XML	Yes	

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		Functionality	QTI file...	Import ?	Comments
1.22		being able to have the answer options displayed in random order	QTI_MC_101_LITE.XML	No	Because of lacking <reprosessing> element .
			QTI_MC_XXX.XML	No	Order is fixed, same as in QTI file.
2.		Sections			
2.01		use of sections	QTI_S_MC_201_LITE.XML	No	Individual items aren't imported either. As a result of this the answer to all following questions is 'No'.
2.02		being able to store learning-objectives for a section	-	No	
2.03		being able to store the rubric for a section	-	No	
2.04		being able to store text for a section	-	No	
2.05		being able to calculate a score for a section	-	No	
2.06		being able to give feedback based on the calculated score for a section	-	No	
2.07		being able to store metadata for a section	-	No	
2.08		the ability to display the questions in a random order	-	No	
2.09		the ability to display a question based on the answer for a previous question	-	No	
3.		Assessments			
3.1		being able to exchange assessments	QTI_A_MC_301.XML	No	Individual items aren't imported either. As a result of this the answer to all following questions is 'No'.
3.2		being able to store learning-objectives for an assessment	-	No	
3.3		being able to store the rubric for an assessment	-	No	
3.4		being able to store text etc. that is relevant for the complete assessment	-	No	
3.5		being able to calculate a total score for the assessment	-	No	
3.6		being able to give feedback for the assessment based on the calculated total score	-	No	
3.7		being able to store metadata for the assessment	-	No	
3.8		being able to have sections and/or items in an assessment displayed in random order	-	No	
3.9		the ability to display a question based on the answer for a previous question	-	No	

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