

Requirements and Recommendations

The following table provides an itemised list of 56 requirements, some of which are associated with further recommendations.

The requirements have more force than the recommendations—but neither are written in stone. The authority of both depend on the extent of support expressed by the industry consultations already undertaken, by ongoing consultations with industry and end-user groups, and the force of any argument that they are required to support a technically, commercially and pedagogically coherent set of outputs.

It is anticipated that if the team responsible for outputs wish to reject any of the requirements, then they will need to argue the case to key stakeholder groups that such a requirement is not justified.

The recommendations are offered to elucidate the intention behind the requirements and to suggest a possible approach to their fulfilment; but it will be for the technical team to decide whether they wish to use these recommendations or not.

As far as the technical team are concerned, therefore, requirements are mandatory (subject to further consultation as envisaged above) and recommendations are optional.

As far as suppliers are concerned, the proposed outputs at this stage of the project are envisaged as a set of guidelines and it is in the nature of guidelines that mandation is not appropriate. All requirements on suppliers are therefore expressed with the word “should” rather than “must”. What under an eventual compliance regime will become mandatory is expressed at this stage as “should always”.

Each requirement is coded on each of four scales.

Purpose

P	Pedagogical	indicating direct benefit to teaching and learning;
C	Commercial	to stimulate an effective market;
S	Search & discovery	to aid the ability of teachers to find the best content;
T	Technical	to ensure the technical coherence of the outputs.

In some cases, it may be argued that requirements fall into several categories

Desirability

E	Essential	An assessment of the importance of the requirement, judged either by the extent of its support in the industry consultations or by its place in the <i>Technical Discussion and Rationale</i> .
U	Useful	
M	Marginal	

Difficulty

T	Trivial	Where it is anticipated that implementation... will be very easy;
S	Straightforward	will involve no special difficulty;
P	Problematic	will involve some special difficulty.

Support

C	Consensual	The extent of support for a particular requirement, as revealed through consultation or previous discussions within SALTIS.
D	Dominant	
F	Fragmented	
?	Untested	Requirements which have emerged from the <i>Technical Discussion and Rationale</i> may not yet have been subjected to consultation—these will be discussed further at the SALTIS meeting of 17 th November.

Details **highlighted in yellow**, will also require further validation through discussion at the SALTIS meeting of 17th November.

Justification and references

Short justifications are included in the table, summarising the main reasons for the inclusion of a requirement. The full justification is given in the references to the following documents, which are available on the SALTIS website:

Title	Abbreviation
Interim report on content publisher interviews	CPI
Technical discussion and rationale	TDR
Report on VLE interviews	VLEI
SALTIS Proposal for a Content Packaging Profile for UK Schools	PCPP

Learning objects

The term learning object (LO) is used in the requirements to refer to a content object which might be either a static resource or a third party plug-in, application or web service.

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I	Backwards compatibility								
1	As far as possible, the profile must ensure backwards compatibility with packaging widely supported in the current market.	C	U	S	C	Implementation of the profile is likely to be disrupted if it is perceived to “break” existing practice.	1a	Guidelines should specify how VLEs should handle legacy content which may not conform to mandatory requirements.	
II	File and package sizes								
2	The guidelines must specify that all VLEs should always allow the reliable uploading of packages of at least 100MB from a connection with an upload speed of 250kbps .	T	E	S	D	The imposition of arbitrary file size limits, sometimes implicitly by the timing-out of HTTP uploads, has been a frustration for publishers.			CPI p25.
3	It must be possible to upload courses larger than the maximum package size specified in (2), using child manifests. It should be possible to upload linked manifests as separate files, while (i) ensuring the integrity of the whole upload and (ii) preventing circular references.	T	E	P	?	Reconciles the desire of publishers to supply large courses with the practicalities of running a file server, and supports future sequencing and re-mixing models. For these reasons, child manifests are rated as essential, even though it is recognised that they may be seen as problematic because they have not been widely implemented to date.	3a	The guidelines should show how a series of linked child manifests can be uploaded sequentially to a VLE, ensuring that this process can be managed either automatically or at least easily by non-technical teaching staff.	VLEI
4	Package (.zip) and manifest (.xml) files should be given new file extensions, (i) making the identification of compliant packages easier, and (ii) allowing VLE providers, if they wished, to develop customised upload managers supporting “push” technologies.	T	U	S	?	The creation of a custom file extensions opens the possibility of creating specialist upload managers without creating problems of backwards compatibility as VLEs can also support .zip and .xml extensions.			CPI p37.
5	VLEs should be able to access remote content where appropriate, while publishers should not for the moment package remote content which (i) is subject to cross-domain scripting issues, (ii) is password protected.	T	U	S	D	Though not all publishers will want to host their own content, the imposition on VLEs of the requirement to host (i) is unsustainable in the long term (ii) creates unnecessary tensions over file sizes, and (iii) confuses the definition of a VLE as a content <i>manager</i> and encourages their development as closed environments.	5a	Guidelines should be provided to publishers on circumstances in which files should be included within the package and circumstances in which they are properly hosted remotely.	CPI p10 & p37
							5b	VLE providers should be advised on the need to check remote links and on what action to take when broken links are found.	VLEI

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III	Runtime								
6	The first version of this profile must use SCORM 2004 3 rd Edition, as the basis from which to implement the runtime requirements in this section. Note this does not mandate the implementation of the complete SCORM 2004 specifications. There is no requirement to implement Simple Sequencing or any runtime functionality not specifically covered in these requirements.	C	U	T	C	(i) SCORM 2004 3 rd Edition has been adopted in the UK market, (ii) no other runtime specification is currently capable of delivering the functionality required, but (iii) when the principle of runtime interoperability has been established, it should be easy for VLEs to introduce parallel implementations of other emerging standards.			CPI p11
7	VLEs should always provide a standard means by which LOs can report a single headline score for each attempt made at an appropriate task. and where this data is reported, it should always be displayed to the user by the VLE.	P	E	S	C	This was rated by publishers as their top priority.	7a	Scores should be reportable as either (i) a scaled percentage or (ii) raw marks.	CPI p14 TDR p18–22
							7b	In the case of scaled percentage scores, guidelines should explain how these scores should be calculated on incomplete attempts, both in suspended and finished states.	
							7c	Where applicable, raw marks should be accompanied by a report of the maximum number of marks that the student could potentially have scored.	
							7d	Guidelines should cover the handling of maximum marks where these might be variable or where the concept might be inappropriate.	
							7e	It should be assumed that the minimum number of marks that a student might have scored will always be 0 and therefore the CMI field <i>score.min</i> should not be supported.	
8	VLEs should always preserve scores attached to multiple attempts at the same assignment.	P	E	S	C		8a	Guidance should explain the difference between finishing and completing an attempt, explaining how an attempt is closed and in what circumstances data from an attempt should be discarded.	CPI p7 TDR p17

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9	VLEs should always provide a standard means by which LOs can report both student progress through an attempt and completion status and where this data is reported, it should always be displayed to the user by the VLE	P	U	T	?	Progress and completion status are useful in supporting the interpretation of scores – a low score may be due to poor progress rather than incorrect answers.	9a	Guidance should be given on the calculation of <i>progress_measure</i> for different kinds of activity.	TDR p16–17
							9b	Guidance should be given on the appropriate mapping between <i>progress_measure</i> and <i>completion_status</i> .	
10	VLEs should always provide a standard means by which LOs can report time elapsed during the course of an attempt and where this data is reported, it should always be displayed to the user by the VLE	C	E	T	?	(i) Time elapsed will support the analysis of results data, helping to distinguish between struggling and careless students; (ii) it will help validate values given for <i>typicalLearningTime</i> .	10a	Guidelines should allow that VLEs should use this data where reported but, where not reported, they should be free to make their own measurement of time elapsed.	TDR p23 TDR p30–31
11	VLEs should always provide a standard means by which LOs can save and reload state on the VLE.	P	E	S	C	A function rated highly in the content publisher interviews and a prerequisite of “anytime anywhere” access to interactive content.	11a	The LO should be able to read and write state data to the VLE in any binary format .	CPI p15
							11b	The SPM for the state data should be 64KB.	
							11c	An object should inform a VLE when it is finishing in “suspended” mode using the CMI field <i>exit</i> with a vocabulary of “ <i>suspend</i> ” and “ <i>normal</i> ”.	
							11d	A VLE should inform an object, when it is launched, whether or not it is resuming a suspended attempt using the <i>entry</i> element.	
							11e	The guidelines should cover which other standardised runtime data (such as scores) should also be treated as state data.	
12	VLEs should always provide a standard means by which LOs can read initialisation parameters declared in the content package and passed through the VLE.	T	E	T	?	While initialisation data will in future allow for teacher-adaptable content, the principle reason for this requirement in the current version is the technical need to clarify data dependencies within the disaggregation model.			CPI p22 & p33–36

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13	VLEs should always be able to provide LOs with a unique but anonymous identifier for the user, allowing the LO to understand when two sessions are being launched for the <i>same</i> user, but not to know who that user is.	P	U	S	?	(i) The learner ID is a pre-requisite for multi-player interactions (ii) it is likely to be required to support future automatic authorisation on a per-student basis, (iii) it may be used in the meantime to support the personalisation of third-party services; and (iv) it is useful to establish from the start the principle of “unique but anonymous” identification of students, for the purposes of data protection.	13a	Guidelines should be provided on the generation and formatting of the student identifiers. It is recommended that a GUID, generated by the VLE should be used.	VLEI
							13b	Guidelines should explain precautions required of VLEs and publishers to maintain the anonymity of the student identifier.	
							13c	Guidelines should be given on the proper use of the anonymous identifier for administrative and tracking purposes.	
14	VLEs should always be able to provide LOs with a suitable term of address for the user.	P	U	T	?	Although somewhat cosmetic, this feature has been rated “useful” on the grounds that it not only boosts student motivation to be addressed personally, but also that it is a palpable mark of personalisation which can therefore raise recognition of the standard amongst end-users. It is also trivial to implement.	14a	Guidelines should be given on the appropriate formatting of the term of address.	TDR p24

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III	Disaggregation								
15	The profile and supporting guidelines must provide a robust disaggregation model, showing how a single package can be broken apart into separate resources and aggregations of resources, which can be used independently.	P	E	P	C	A critical pre-requisite for the implementation of sequencing, which was seen by publishers as a key function of VLEs. Also rated in its own right by publishers of structured courses.	15a	The disaggregation model should take account of the argument for a 4-way classification of learning objects.	CPI p5, p16–17, p32, & p39 TDR p2–10
16	The disaggregation model must allow publishers to control all permissions on the extent of disaggregation allowed by the VLE.	C	E	S	C	Required to address publisher concerns that disaggregation may undermine their intellectual property.			CPI p16
17	The disaggregation model must ensure that disaggregated objects will play reliably, taking into account all file and data dependencies.	T	E	P	C	A self-evident pre-requisite for disaggregation.			CPI p33–36
18	The guidelines must explain clearly to publishers their obligation to ensure object encapsulation, wherever they indicate that their content may be disaggregated.	T	E	P	D	Encapsulation is an essential prerequisite of disaggregation, which in turn is considered to be essential to the future of the VLE as a content management infrastructure. The requirement for encapsulation will effect the design of some publishers' content—but they always have the option to choose not to disaggregate. (see requirement 16).	18a	Guidance should be provided explaining how resources can use the runtime to provide “automated encapsulation”.	TDR p3–7
							18b	VLEs should take care not to provide a runtime API to resources which do not declare themselves to be SCOs	

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19	The guidelines must explain what disaggregation means in terms of the VLE user experience.	P	E	P	C	Technical concepts like “disaggregation” are meaningless unless they impact on the user experience. Requirements to implement disaggregation in meaningful ways are likely have an impact on the ways in which some VLE are implemented. This requirement is nevertheless included because it is fundamental to the future of content interoperability and to the purpose of VLEs, when understood as content management infrastructures.	19a	VLEs should allow disaggregated resources to be assigned (if the concept of assignment is appropriate to the VLE) and launched without any visual reference to other parts of the package in which the disaggregated resource was distributed.	CPI p39 TDR p10
							19b	VLEs should always launch disaggregated objects without any delays due to the loading of other resources or associated metadata from the package in which the disaggregated resource was distributed.	
							19c	VLEs should always by default allow users to relocate disaggregated resources within any structure that the VLE uses for the organisation of content.	
							19d	If the VLE allows users to create or edit simple “table of contents”-type aggregations (as encoded under an IMS Content Package organization node), then it should be possible to include disaggregated resources within such organisations.	
20	Publishers must be provided with a mechanism for packaging supporting files, associated with a parent LO and where such supporting files are declared, the VLE should always display them appropriately in association with their parent learning object.	P	U	S	D	Corresponds to existing practice which has attracted support from publishers.			

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IV	LOM—general								
21	Separate LOM profiles must be provided for (i) manifests, (ii) assignable resources, as defined by the disaggregation model (iii) aggregations of such resources, (iv) supporting files attached to such resources, and (v) non-assignable assets.	T	E	S	C	(i) There is a clear need for guidance both on <i>where</i> metadata should be attached to the package and <i>what</i> should be included in the metadata record, depending on the location within the content package; (ii) The use of different metadata profiles in different positions in the package supports other objectives; (iii) The use of different metadata profiles could be used as a means of distinguishing between different types of resource within the content package – see the SALTIS Proposal for a Content Packaging Profile for UK schools.	21a	The general presumption should be that metadata fields will be either mandatory or not supported. Where optional fields are allowed, this should be justified and default behaviours provided for.	TDR p25 PCCP
							21b	Metadata profiles should be adopted as shown in the <i>Technical Discussion and Rationale</i> .	TDR p33–37
							21c	Resources and aggregations should be required to provide one global identifier as a 128 bit UUID (aka GUID).	TDR p27
		T	U	S	?	Centralisation of metadata (for example, in a metadata or product record) avoids the duplication of data and in some circumstances helps maintenance.	21d	The guidelines and specification should consider a common approach to the centralisation of metadata.	TDR p35
		T	U	S	?	Semantic web technologies are likely to allow the production of richer, user-generated data, supporting folksonomies and leveraging the “wisdom of crowds”, without imposing extra burdens on publishers.	21e	The guidelines should give consideration should be given to the future extensibility of authoritative metadata to support folksonomies, possibly using semantic web technologies such as are being pioneered by the ISO/IEC MLR project.	

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V	LOM—description, branding and copyright								
22	Manifests, aggregations and resources should always be provided with short and long versions of titles (SPM 50 and SPM 1000 respectively) and descriptions (SPM 200 and SPM 2000 respectively).	P	E	S	C	VLE provider interviews support the requirement for short titles and descriptions. Publisher interviews support the need for these fields to be displayed appropriately.	22a	Guidelines should be given on the writing of appropriate and informative titles and descriptions.	TDR p26 VLEI
23	VLEs should always display information about authors, publishers, suppliers and rights holders associated with the production of a resource.	C	E	S	C	Effective attribution of content is (i) just, and (ii) supports the emergence of quality content.			
24	There must be an agreed mechanism whereby aggregations, resources, assets and supporting files can be given long and short copyright notices.	C	E	S	C	Short copyright notices support the display of notices within the normal working interface.	24a	The short copyright notice (or attribution, where no copyrights are claimed) should be generated by an agreed format from the <i>contribute</i> record(s).	CPI p11 & p16
25	There must be an agreed mechanism for including a click-through license, to which the VLE should always ensure that the licensee has agreed before A LO may be run.	C	E	S	?	A recognised legal requirement for all software publishers which deployment on a VLE might otherwise circumvent.	25a	The click-through license should be attached to a product record, to which a learning object or manifest can associate itself by use of an <i>isPartOfProduct</i> relationship.	CPI p37
						25b	Depending on a VLE's implementation model, a click-through license, if supplied, should always be displayed to the user either when the content package is (i) loaded or (ii) accessed for the first time. In either case, the person accepting the license should always be in the role of <i>teacher</i> or <i>manager</i> .		
26	There must be a mechanism for the association of manifests, aggregations and resources with multi-resolution icons.	P	U	S	C	Introduced by BBC Jam, supported in publisher interviews, and generally welcomed in VLE interviews as supporting the branding and easy identification of content.	26a	Standard resolution sizes should be specified, (for example, 16, 32, 48, and 64 pixels square).	CPI p27–28
27	There must be an agreed mechanism for the association of manifests, aggregations and resources with previews (or screenshots).	P	U	S	C		27a	A standard size for previews should be specified (for example, 300 x 200 pixels).	

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28	There must be a mechanism for the association of manifests, aggregations, resources and assets with multi-resolution company logos.	C	U	S	D	Generally welcomed in publisher and VLE interviews, with the proviso that display should not be intrusive.	28a	Guidance should be given on the standard sizes for company logos, their formatting, and their presentation on screen.	CPI p28–29 TDR p10–12
29	Guidance must be given on the circumstances in which VLEs should always display titles, descriptions, icons, previews, supplier logos and copyright notices to users.	C	E	P	D	Branding, copyright and consistent naming of content within learning platforms is valued by most publishers, is likely to be necessary to support their business models and are often welcomed by VLE providers on the grounds that they help users identify, select and manage content in an interesting, visual interface. It is recognised that the implementation of this requirement may impact on the user interface of some VLEs—but the requirement is considered to be essential to the role of the VLE as a content management infrastructure.	29a	Short titles and either an appropriate size of icon or an appropriately sized preview should always be displayed whenever an aggregation or resource is shown in a list or given a default link.	TDR p12 PCPP p31–32
							29b	Short title, icon or preview and short copyright or attribution should always be shown (i) whenever a resource is being run and a VLE interface is visible, (ii) whenever the mouse hovers over a customised or user-created link, and (iii) along with short description, whenever the resource is selected in the teacher interface.	
							29c	Long title, and, if supplied, long description, long copyright and publisher logo should always all be displayed in an “About…” screen which can be accessed easily in any teacher interface.	
30	VLEs should never allow original and authoritative title, description and other branding information to be over-written.	C	E	S	C	Mechanisms for building brand reputation is a critical means of rewarding the best quality content and thereby encouraging innovation.	30a	Where original title and branding are “virtually overwritten” by the creation of user-defined links, VLEs should always display original descriptive information in some way (for example, in a pop-up shown when the mouse hovers over the user-created link).	CPI p10
31	VLEs should never display branding in any interface which is displayed concurrently with a running LO.	C	U	S	?	Avoids confusing visual clashes and implication of endorsement or partnership between the two brands.	31a	Note that this requirement does not apply to assets, which are designed for use within other applications.	TDR p12 CPI p10

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VI	LOM—search and discovery								
32	VLEs should always provide facilities to search available content. The extent of the searchable content pool will vary according to the VLE. The search engine should always, as a minimum, index the data specified in this section.	S	U	S	C	Not all publishers regarded search as critical – but many thought it would become more significant as VLEs became more heavily populated with content.	32a	Where appropriate fields are specified as mandatory for content publishers, VLE providers may wish to create browsable hierarchies or other navigational devices which exploits this data.	CPI p10 & p19–20
33	Guidance must make clear that VLEs should be free to supplement formal metadata, e.g. in the use of usage data and folksonomies; but not in ways which prioritises results for commercial advantage.	C	E	S	D	Provision to encourage innovation in the provision of search services, while preventing the abuse of what might become a dominant position in the marketplace.			
34	Keywords must be optional for publishers but, where provided, should always be indexed by VLEs.	S	U	S	D	Keywords provide the easiest means of informal tagging for publishers.			CPI p12
35	For resources, <i>learningResourceType</i> must be mandatory, having a vocabulary of <i>Assessment, Drill and practice, Exploration, Glossary, Guide, Information resource, Open activity, Tool</i> .	S	U		?	If consistently implemented, will support search and informed purchase.	35a	SPM should be reduced to 3, which would be proportionate to the reduced vocabulary and would prevent over-tagging.	TDR p29–30
36	For resources <i>typicalLearningTime</i> must be mandatory.	S	E	P	?	Provides useful information for teachers planning lessons and also provides a necessary counterbalance, when informing purchase, to information about the number of disaggregated resources included in a product. Difficulties in ensuring consistent use can be overcome by the collection of usage data.	36a	Guidelines should be provided on the calculation of <i>typicalLearningTime</i> for standard content types.	TDR p30 & p38–39
							36b	Guidelines should suggest an appropriate policy on approximation, to provide a necessary degree of resilience to the data.	
							36c	The element <i>typicalLearningTime</i> 's child, <i>duration</i> could be supplemented by <i>shortDuration</i> and <i>longDuration</i> , allowing for an optional range of values, to provide the resilience sought by 36b.	

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37	For aggregations and resources, <i>typicalAgeRange</i> must be optional.	S	U	S	?	Useful information to support search and to inform purchase, for use where chronological age does not match educational or curriculum-related age.	37a	Guidance should clarify the differences between different types of age data.	TDR p30
							37b	Guidance should clarify assumptions can be made for <i>typicalAgeRange</i> , based on other metadata such as for key stage.	
38	Where appropriate vocabularies exist, information about intended curriculum and intended educational level should always be included in the classification section and, where provided, should always be indexed by VLEs.	S	E	S	D	Some publishers are sceptical about the use of formal vocabularies at all, particularly in view of the current lack of a robust central mapping infrastructure. Others see them as useful ways of matching potentially synergistic content. What is suggested at this stage is a simple profile that should not be too onerous to implement and which much existing content will already support.	38a	See the Technical Discussion and Rationale for recommendations for supported vocabularies.	TDR p33–34
39	More detailed classification data may optionally be included by publishers and optionally supported by VLEs.	S	U	P	F	There is not sufficient support to mandate the use of detailed “Programme of Study” vocabularies and it is doubtful that, without being mandated, they will achieve the required critical mass for useful implementation.	39a	By proposing the optional use of “Programme of Study” vocabularies, it may be possible for VLEs to make the running by monitoring usage and thereby populating a more detailed programme of study type classification. Publishers could specify default values if and when they thought it was worth their while.	
40	All contributor records with a role of “ <i>author</i> ” and “ <i>publisher</i> ” should always be indexed by VLEs to allow users to search for all content by a particular author or publisher.	S	E	S	D	The ability to search on a publisher or author is a essential in the development of brand and author reputations. It becomes more important as disaggregated objects are reorganised by school programme of study rather than by supplier.			TDR p2
41	Guidelines must advise publishers on the optional use of <i>general . language</i> , and <i>educational . language</i> to indicated the language of the resource and the intended language of the user respectively.	S	M	S	?		41a	In both cases, the default of <i>English</i> should be assumed.	

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VII	LOM—visibility of resources							
42	Resources, aggregations, assets and supporting files must have a mechanism to indicate an <i>intendedEndUserRole</i> , with a vocabulary of <i>Learner</i> (default), <i>Teacher</i> , <i>Manager</i> , <i>Parent</i> , and <i>Author</i> .	P	U	P	D	Supports the concept of teaching notes, which is implemented by at least one VLE and is generally welcomed by publishers. It is recognised that not all VLEs have a straightforward concept of user role and this requirement is probably not sufficient to justify the imposition of such functionality. But the requirement is included because it is anticipated that user role will become necessary in any case in order to manage access to data and other functions such as assignment (see 27b), and that future versions of the runtime will also require VLEs to inform resources of user role.		CPI p41 TDR p30.
43	VLE providers should always restrict the visibility of resources marked with particular <i>intendedEndUserRole</i> values to appropriate users.	P	U	P	D			
VIII	Metadata to describe runtime behaviour							
44	Guidelines must be provided for the inclusion within the manifest of metadata to describe a resource's runtime behaviour. This section includes requirements for four items of data but this number may be extended in future versions of the profile.	T	E	P	?	The Technical Discussion and Rationale argues that this it is a critical weakness of current runtime specifications that resources make virtually no prior declaration of expected runtime behaviour.		TDR p18-22
45	Allow resources to be given a <i>technicalType</i> with a vocabulary of <i>interactive</i> , <i>dynamic</i> , <i>static</i> and <i>asset</i> .	T	E	S	?		45a Guidelines should explain the meaning and use of these terms.	TDR p8-10

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46	A <i>scoreType</i> field should always be used by all interactive resources, using a vocabulary of <i>raw</i> , <i>scaled</i> , <i>variable</i> , <i>unlimited</i> and <i>none</i> .	T	E	S	?	Without this data, VLEs are not able to format marks data in ways commonly used by teachers.	46a	Only resources of <i>technicalType</i> ="interactive" may return scores.	TDR p18–20, where the proposal suggests a slightly different vocabulary.
							46b	Guidelines should explain the meaning and use of the <i>scoreType</i> vocabulary and its relationship to the <i>absoluteMaximumMarks</i> (47).	
47	Interactive resources which are declared with <i>scoreType</i> ="raw" should always also declare a value for <i>absoluteMaximumMarks</i> of type "integer".	T	E	S	?		47a	Guidelines should explain the relationship of <i>absouteMaximumMarks</i> to <i>scoreType</i> .	
48	Interactive resources should always declare a metadata field <i>canSaveState</i> with a vocabulary of <i>true</i> and <i>false</i> .	T	U	S	?	VLEs may wish to allow teachers to delete state or turn off the saving of state in certain circumstances.	48a	Guidelines should explain the implications of declaring <i>canSaveState</i> ="true" and give examples of how to save state reliably.	TDR p22
49	VLEs should never display any user interface alongside an <i>interactive</i> resource which is in an active state.		E	S		These measures are required to avoid the clash between interactive resources and VLEs running <i>choice</i> sequence.			TDR p7–9
50	Resources marked as interactive should always cease all activity and display a disabled interface after making a call to <i>Terminate</i> .		E	S					
51	Guidance must be given on how VLEs should manage any errors in the declaration of runtime behaviour in the metadata fields above.	T	U	P	?	It is an unavoidable consequence of declaring runtime behaviour that such declarations might be objectively incorrect—and it is a consequence of the importance attached to this section that these potential errors need to be managed.	51a	In the immediate term, the options available will be a combination of (i) modifying their local copy of any declarations of runtime behaviour to correspond to the way that an interactive resource behaves in practice; (ii) ignoring the declared behaviour that does not correspond to the declared behaviour in practice; and (iii) reporting any errors to the publisher or certifying authority.	TDR p21–22

	Requirements	Purpose	Desirability	Difficulty	Support	Justification	Recommendations	References
IX	Text formats							
52	All metadata records should always be encoded as UTF-8 and VLEs should always display extended characters correctly.	T	E	T	C	These are both technical issues which previous conversations on SALTIS have highlighted.		
53	All filenames should always be formatted so that they work on all server platforms (in particular, ensuring that they will work on Linux as well as Windows platforms).	T	E	T	C			
X	Best practice guidelines							
54	Where necessary, best practice guidelines must re-enforce requirements which may be laid down by existing standards but which experience has shown may be widely ignored or misunderstood.	T	U	S	C	It is clear that the consistency of packaging and the ability to implement the basic runtime is sometimes variable. While in the long term, this is an issue which might be solved by the provision of a common packaging tool, the provision of guidelines might be a useful interim measure.	54a	Issues that may need re-emphasising are: correct use of dependencies within IMS content packaging and correct use of <i>scormType</i> .
55	Guidance and examples of best practice must be provided on the implementation of the SCORM runtime with Flash.	T	U	S	C		55a	Guidelines should provide working examples of how to read and write values, passing them in and out of the Flash movie, approaches to formatting initialisation and state data, and how to handle errors.
56	Guidance must be provided on the proper implementation of the <i>Terminate</i> function.	T	E	S	C		56a	In particular, guidelines should cover the need to handle multiple calls to <i>Terminate</i> and calls which originate from the user closing down the browser.

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