IMS Learner Information Packaging XML Binding

Version 1.0 Final Specification

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About This Document

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1. Introduction

1.1 IMS Learner Information Specifications Overview

IMS *Learner Information Package* is based on a data model that describes those characteristics of a learner needed for the general purposes of:

- Recording and managing learning-related history, goals, and accomplishments;
- Engaging a learner in a learning experience;
- Discovering learning opportunities for learners.

The specification supports the exchange of learner information among learning management systems, human resource systems, student information systems, enterprise e-learning systems, knowledge management systems, resume repositories, and other systems used in the learning process. In this document such systems will be called *learner information systems* regardless of any other functionality they possess or roles they fulfil. The IMS Learner Information Package specification does not address requests for learner information or the exchange transaction mechanism.

1.1.1 Requirements

IMS Learner Information specifications are designed to meet the following requirements:

- *Distributed information:* A learner information system may in fact consist of multiple distributed systems that share learner information or that store learner information in a distributed fashion. This necessitates the inclusion of adequate indexing and time stamping of learner information data as it is packaged;
- *Scalability:* To support large-scale systems it is necessary to exchange and reassemble chunks of arbitrary granularity as well as bulk transfer. Packaging of multiple LIPs will use the IMS Content &Packaging specification;
- *Privacy and Data Protection:* Learner information systems must be able to implement privacy and data protection policies and insure the integrity of data;
- *Flexibility and External references*: Learner information includes many constructs, such as learning objectives and learning history, which are in practice represented by different structures in different contexts. Learner information data models must be flexible enough to accommodate this need.

Privacy and Data Protection

The IMS project recognizes the need to:

- Maintain the privacy of learner information;
- Protect information from inappropriate access;
- Ensure the integrity of information;
- Accommodate the regulatory policies and requirements of different jurisdictions.

IMS Learner Information Package enables the inclusion of mechanisms for maintaining privacy and protecting the integrity of data with *all* data that comprises learner information. The specification cannot, however, specify the form, format, or type of these mechanisms or policies for their use. These must be determined by specific implementations in accordance with their requirements.

1.1.2 Learner Information Data and Meta-data

IMS Learner Information Package is a structured information model. An XML binding is included but is not meant to exclude other bindings. The information model contains both *data* and *meta-data* about that data. The model defines fields into which the data can be placed and the type of data that may be put into these fields. Typical data might be the name of a learner, a course or training completed, a learning objective, a preference for a particular type of technology, and so on. Meta-data about each field can include:

- Time-related information;
- Identification and indexing information;

- Privacy and data protection information.

This meta-data is available for each and every field in the information model, either directly or via inheritance.

1.1.3 Learner Data Structure

The learner information model can be viewed in three different ways:

- A tree;
- An object model;
- A tabular representation.

All three ways are explained in the specification. The Learner information is separated into eleven main categories (as shown in Figure 1.1). These structures have been identified as the primary data structures that are required to support learner information. This composite approach means that only the required information needs to be packaged and stored.

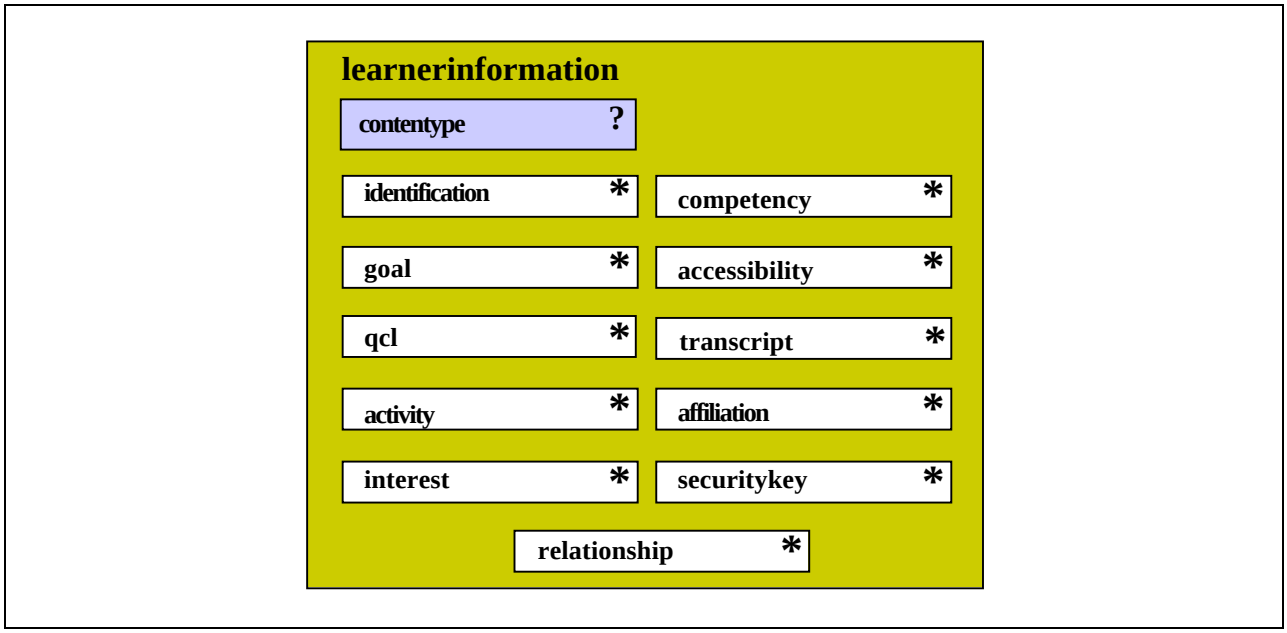

Figure 1.1 The IMS Learner Information Package (LIP) core data structures.

- *Identification:* Biographic and demographic data relevant to learning;
- *Goal:* Learning, career and other objectives and aspirations;
- *Qualifications, Certifications and Licenses (qcl):* Qualifications, certifications and licenses granted by recognized authorities;
- *Activity:* Any learning-related activity in any state of completion. Could be self-reported. Includes formal and informal education, training, work experience, and military or civic service;
- *Transcript:* A record that is used to provide an institutionally-based summary of academic achievement. The structure of this record can take many forms;
- *Interest:* Information describing hobbies and recreational activities;
- *Competency:* Skills, knowledge, and abilities acquired in the cognitive, affective, and/or psychomotor domains;
- *Affiliation*: Membership of professional organizations, etc. Membership of groups is covered by the IMS Enterprise specification;
- *Accessibility:* General accessibility to the learner information as defined through language capabilities, disabilities, eligibilities and learning preferences including cognitive preferences (e.g. issues of learning style),

physical preferences (e.g. a preference for large print), and technological preferences (e.g. a preference for a particular computer platform);

- *Securitykey*: The set of passwords and security keys assigned to the learner for transactions with learner information systems and services;
- *Relationship:* The set of relationships between the core components. The core structures do not have within them identifiers that link to the core structures. Instead all of these relationships are captured in a single core structure thereby making the links simpler to identify and manage.

These categories were chosen to meet the requirements of a large variety of use cases and to facilitate mapping among IMS and other relevant specifications. Within each category several data elements and structures are defined. Some of these are specified explicitly as data types (language strings, for the most part) and others are defined as recursive hierarchical structures. In addition, data may be defined by referencing mechanisms. The referencing mechanisms supported are internal references, references to an external learner information system, and references via a URI.

1.1.4 Learner Information Meta-data

The learning information meta-data (contained within the 'contentype' structure shown in Figure 1.1) is broken into four categories:

- *Time Information:* Time of creation and time of expiration of a piece of data;
- *Index and Source:* Supports a pair consisting of a source and an ID assigned by that source, a local index that is used for cross-referencing, and a URI;
- *Privacy and data protection information:* Unstructured data to be determined by practice and implementation.

All learning information data elements have meta-data sub-elements with the exception of atomic elements that can always inherit their meta-data. For example, in the *Identification* category, meta-data is associated with the *Name* element but not with its constituent elements since it is felt that the meta-data for the constituent elements cannot change independently of the meta-data for the *Name* element itself.

1.2 Scope & Context

The IMS Learner Information Package (LIP) XML Binding describes the XML Schema binding of the LIP Information Model. A Document Type Definition (DTD) representation is also included for the binding but this is not formally supported. Version 1.0 of the eXtensible Markup Language (XML) specification of the World Wide Web Consortium (W3C) is used.

This binding has been derived from the agreed IMS Learner Information Package Information Model specification [LIP, 01b] and conforms to the XML Version 1.0 specification [XML, 98] of the W3C.

1.3 Structure of this Document

The structure of this document is:

2. XML BASICS	A brief description of the components within an XML schema;
3. NARRATIVE DESCRIPTION OF THE XML BINDING	The XML Schema used to describe the *Learner Information*;
4. PHYSICAL REALISATION OF THE XML BINDING	The manner in which the XML binding is realised as a series of separated but related XSD files;
5. EXAMPLE XML SCHEMA	Examples of the XML schema as applied to typical learner information interchange;
APPENDIX A - LIP DTD (UNCOMMENTED)	A copy of the uncommented DTD (this is informative only and is not a formally supported binding).

1.4 Nomenclature

ANSI	American National Standards Institute
CDATA	Character Data
DTD	Document Type Definition
EDI	Electronic Data Interchange
FE	Further Education
GUI	Graphical User Interface
HE	Higher Education
HRMS	Human Resource Management System
IEEE	Institute of Electronic & Electrical Engineers
JPEG	Joint Photographic Expert Group
LIP	Learner Information Packaging
LLL	Life-long Learning
LTSC	Learning Technology Standards Committee
NVC	National Validation Center
PAPI	Public & Private Information
PCDATA	Parsed Character Data
QTI	Question & Test Interoperability
SIF	Schools Interoperability Framework
UCAS	University Council for Admissions Services
UML	Unified Modelling Language
URI	Universal Resource Identifier
W3C	World Wide Web Consortium
XDR	XML Data Reduced
XML	Extensible Mark-up Language
XSD	XML Schema

1.5 References

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2. XML Basics

The Learner Information Packaging data model has been defined as a hierarchy. Hierarchical models are convenient for representing data consisting of many elements and sub-elements. XML is perfectly suited for representing hierarchical models. An XML document is a hierarchy comprised of **elements** that have **contents** and **attributes**.

2.1 Elements

An element is a component of a document that has been identified in a way a computer can understand. Each element has a **tag name**. When a tag name is shown as "<TAGNAME>", with less-than and greater-than symbols before and after the tag name, it serves as the **start-tag** to mark the beginning of an element. When that same tag name has a forward slash "/" added, it serves as an **end-tag** such as "</TAGNAME>". An element may have contents between its start and end-tags and may have one or more **attributes**. When an XML element has a start and end-tag (also called an **opening** and **closing tag**) with a common name, it is considered to be "well-formed" XML. The contents of an element are placed between the start and end-tags as shown below:

```
<TAGNAME>contents</TAGNAME>
```

2.1.1 Element Contents

An element may contain other elements, Parsed Character Data (PCDATA), Character Data (CDATA), or a mixture of PCDATA and elements. The allowable contents of an element are its **content model**. PCDATA really means any character string that does not contain elements. PCDATA is what the bulk of elements will use between their start and end-tags. CDATA is different in that it is a method for adding any character data that should not be processed. For example, you could add some Java script code instructions using a CDATA section. A CDATA section tells the parser not to look for any markup until after it locates the end of the CDATA section.

2.1.2 Element Attributes

An attribute provides additional information about an element. Attributes are a way of attaching characteristics or properties to the elements of a document. An element may have more than one attribute and they are contained within the start tag of an element. Attributes are represented by an attribute name followed by an equal sign and the attribute value in quotation marks:

```
<timeframe>
      <begin restrict="1">1999-07-23</begin>
</timeframe>
```

In this example the <timeframe> element contains another element, the <begin> element. The <begin> element has one attribute "restrict", with the value 1. The value for the element <begin> is "1999-07-23". These two elements then make up a 'timeframe begin' date.

2.1.3 Element Names

Each element has a unique name, referred to as the tag name. XML is case-sensitive in its processing of tag names. The IMS Learner Information Package XML binding adheres to the following tag name rules:

- All tag names will conform to the rules for element naming as given within the XML Version 1.0 specification;
- Names beginning in "xml" in any case or mix of cases are not permitted;
- All element and attribute names in the IMS XML binding are aligned with the W3C XHTML standard and as such will be **lower-case**;
- Element names may not include words reserved by the XML specification. These include:

  DOCTYPE
  ELEMENT
  ATTLIST
  ENTITY

- Tag names defined by the IMS binding may not be redefined, with the exception of those that are used for extensions.

2.2 XML Schema

The LIP version 1.0 XML binding is defined in an XML-Schema. XML-Schema is the primary XML binding control document format of IMS. The XML-Schema defines elements, their content models, and attributes. It also defines the standard IMS vocabularies. The XML-Schema defines the element types and attribute groups separately from the elements. This serves three purposes:

- The element names are declared before the type definitions to prevent any declaration confusions by XML-Schema validators. This is analogous to declaring sub-routine and function names separately at the top of a program unit;
- The complexTypes may be managed more effectively, including support for derived types in the near future. Derivation will be used for harmonization and extension;
- The attributes may be managed more effectively, particularly when the same attributes are used by several elements' complexTypes.

The XML Schema for the IMS LIP is named: **ims_lip_rootv1p0.xsd**.

2.3 Document Type Definitions (DTD)

The *tag name*, *content model*, and *attributes* of elements are defined in a **Document Type Definition** (DTD) statement. These may exist as an external file or a block of text internal to an XML document. Internal DTDs are used to override elements defined in external DTD files, so an internal DTD should be used with care. The DTD defines the elements that may be used, and may define the contents of the elements.

Some XML editors may make use of a DTD to help guide the developer in creating the proper elements at the proper locations in an XML file. Other developers will make use of the DTDs to validate their XML documents to ensure their document is consistent with all of the element names and locations defined in the DTD. An XML document is **valid** if it has an associated document type declaration and if the document complies with the constraints expressed in it. Details of the construction of DTDs are outside the scope of this document, but links to the XML Version 1.0 specification are included in the References (sub-section 1.5) of this document.

The DTD for the IMS LIP is named: **ims_lipv1p0.dtd**

2.3.1 Declaring Element Contents

The information specifying the order and usage of allowable contents for an element are its **content model**. The content model is declared in a DTD (see below). The declaration of the content model is of the general form:

```
<!ELEMENT tagname (Content Model)>
```

The SHORT element can again serve as an example of how an element is declared with its content model:

```
<!ELEMENT  short (#PCDATA)>
```

This element will contain character data (#PCDATA) that can be processed. The XML Specification provides more information about the details for creating and interpreting content models.

2.3.2 Declaring Element Attributes

An example of how the attributes for the element <learnerinformation> is declared in a DTD is found below:

```
<!ELEMENT learnerinformation (sourcedid, goal?, transcript?, qcl?)>
<!ATTLIST learnerinformation type CDATA #IMPLIED>
```

The first line declares that there is an element named <learnerinformation> that must have the <sourcedid> element and is additionally allowed to have <goal> and/or <transcript> and/or <qcl> elements as its contents. The second line begins with "!ATTLIST" to start an attribute list declaration for the <learnerinformation> element. The word 'type' will serve as the attribute's name. The allowable value for this attribute must be of type CDATA.

At the end of the example above is the term IMPLIED. It is at this location in the attribute declaration, where a default value for an attribute may be specified. It is also possible to use the keyword REQUIRED which would force a TYPE value to be supplied and there would be no default value. In the example above, the IMPLIED designation means that the designer wants to allow users to omit the value for the attribute without forcing a particular default value.

2.3.3 Use of Attributes

Within the IMS XML binding, the use of attributes is reserved for information about the structure of the structure of the relevant data object.

Lists

A list is a repetition of the contents of an element. In XML, this is accomplished by repeating the containing element: for example, the <learnerinformation> element contains an element <affiliation>. Described in the DTD as:

```
<!ELEMENT learnerinformation (affiliation*)>
```

When instantiated in XML a repeating list of ITEM elements would appear:

```
<learnerinformation>
      <affiliation> "The first affiliation."</affiliation>
      <affiliation> "The second affiliation."</affiliation>
</learnerinformation>
```

In this example, the element <affiliation>is repeated. Thus <affiliation> is the *containing* element for *the repeated contents* descriptions. The notation for repetitions of an element in a content model follows the XML specification. An asterisk (*) specifies that none or more repetitions of the element may be included in the XML instantiation.

2.4 XML Data Reduced (XDR)

A schema is a formal specification of element names that indicates which elements are allowed in an XML document, and in which combinations. New schema languages, such as those defined in the XML-Schemas Working Group, provide the same baseline functionality as a DTD. However, because these schema languages are extensible, developers can augment them with additional information, such as data types, inheritance and presentation rules. This makes these new schema languages far more powerful than DTDs. For more information about XML schemas, go to http://www.w3.org/XML/Group/Schemas.html.

This specification includes an XML Data Reduced (XDR). Some XML editors may make use of such a schema to help guide the developer in creating the proper elements at the proper locations in an XML file. Other developers will make use of the schema to validate their XML documents and/or to define extensions to the IMS LIP specification. Details of the construction of XDRs are outside the scope of this document.

2.5 Special Handling Requirements

2.5.1 XML Reserved Characters

Some characters used in XML must be escaped when used outside of their XML defined usage as found in Section 2.4 of the XML 1.0 Specification. These characters are ampersand (&), less than (<), greater than (>), apostrophe(') and the double-quotes character("). These characters may be represented using either numeric character references or the strings ",&", "<", ">", "'", and """. Below is a more complete quote from the W3C XML specification:

Quote from Extensible Markup Language (XML) 1.0
W3C Recommendation 10-February-1998
2.4 Character Data and Markup

Text consists of intermingled character data and markup. Markup takes the form of start-tags, end-tags, empty-element tags, entity references, character references, comments, CDATA section delimiters, document type declarations, and processing instructions.

All text that is not markup constitutes the character data of the document.

The ampersand character (&) and the left angle bracket(<) may appear in their literal form only when used as markup delimiters or within a comment, a processing instruction or a CDATA section. They are also legal within the literal entity value of an internal entity declaration; see "4.3.2 Well-Formed Parsed Entities". If they are needed elsewhere, they must be escaped using either numeric character references or the strings "&" and "<" respectively. The right angle bracket (>) may be represented using the string ">" and must, for compatibility, be escaped using ">" or a character reference when it appears in the string "]]>" in content, when that string is not marking the end of a CDATA section.

In the content of elements, character data is any string of characters which does not contain the startdelimiter of any markup. In a CDATA section, character data is any string of characters not including the CDATA-section-close delimiter, "]]>".

To allow attribute values to contain both single and double quotes, the apostrophe or single-quote character (') may be represented as "'", and the double-quote character (") as """.

2.5.2 White Space Handling

Questions arise as to whether web-based data transmission tools might inadvertently strip off or transform some of the white space characters embedded in the LIP data transmitted between systems using XML. To eliminate concern about this issue, refer to the following quote from the W3C XML standards, which indicate that all white space must be preserved where it is part of the data.

Quote from Extensible Markup Language (XML) 1.0
W3C Recommendation 10-February-1998
2.10 White Space Handling

In editing XML documents, it is often convenient to use "white space" (spaces, tabs, and blank lines, denoted by the nonterminal S in this specification) to set apart the markup for greater readability. Such white space is typically not intended for inclusion in the delivered version of the document. On the other hand, "significant" white space that should be preserved in the delivered version is common, for example in poetry and source code.

An XML processor must always pass all characters in a document that are not markup through to the application. A validating XML processor must also inform the application which of these characters constitute white space appearing in element content.

A special attribute named xml:space may be attached to an element to signal an intention that in that element, white space should be preserved by applications. In valid documents, this attribute, like any other, must be declared if it is used. When declared, it must be given as an enumerated type whose only possible values are "default" and "preserve". For example:

```
<!ATTLIST poem xml:space (default | preserve)'preserve'>
```

The value "default" signals that applications' default white-space processing modes are acceptable for this element; the value "preserve" indicates the intent that applications preserve all the white space. This declared intent is considered to apply to all elements within the content of the element where it is specified, unless overridden with another instance of the xml:space attribute.

2.6 Extensibility

Some providers will find the current element set defined in the Profiles Interoperability specification too restrictive to accomplish their purposes. To ensure extensibility, the specification requires that there be no limit on potential extensions on major elements. An extension is the addition of information to an existing XML structure.

```
<!ELEMENT ext_qcl ANY>
```

An example of the inclusion of <extension> in the content model of element <qcl> is:

```
<!ELEMENT qcl (title, registrationno, description, ext_qcl?)>
```

The use of the <extension> element is illustrated as follows:

```
<qcl>
   <title> .. </title>
   <registrationno> .. </registrationno>
   <description>Text entry selections</description>
   <ext_qcl>
            <comments>This is a test to demo extensions</comments>
   </ext_qcl>
</qcl>
```

The contents, but not a content model, of an extension must be declared in an internal or external Schema. Many extensions can be created through the use of existing elements. Care must be used with internal Schemas, as they override external Schemas declarations. The content of an extension must obey the attribute and content models of the elements employed. New elements that duplicate the definitions of existing elements should not be introduced.

Prefacing the <ext_qcl> element with an appropriate namespace may reference descriptions of extensions. For example, a group such as the Advanced Distributed Learning (ADL) initiative may wish to add the “adl” prefix to an extension element to uniquely identify ADL extensions. The following is an example of this:

```
<qcl>
      .. mandatory elements of item elements here
   <description lang= " en " >
            <short>Military profile</short>
   </description>
   <ext_qcl adl:classification="Not classified" adl:title="Psychometric
         question">This example discusses how the psychometric profiles
         are constructed for defence posts.
   </ext_qcl>
</qcl>
```

This serves to note the entire extension structure. Extensions should always be added at the lowest point (farthest from the root element) in the hierarchy possible, to the degree that the structure defines the meaning of the extension.

3. Narrative Description of XML Binding

This specification defines the XML format using narrative. XML XSDs and XML DTDs that implement this 'abstract' format are provided as informative parts of this specification.

3.1 <learnerinformation> Elements

Description: The <learnerinformation> element is the outermost container for the learner information i.e. it is the Learner Information Package. This information can be about an individual or an organisation. Multiple transactions on the same learner information record can be exchanged but these must use separate XML instances of the LIP.

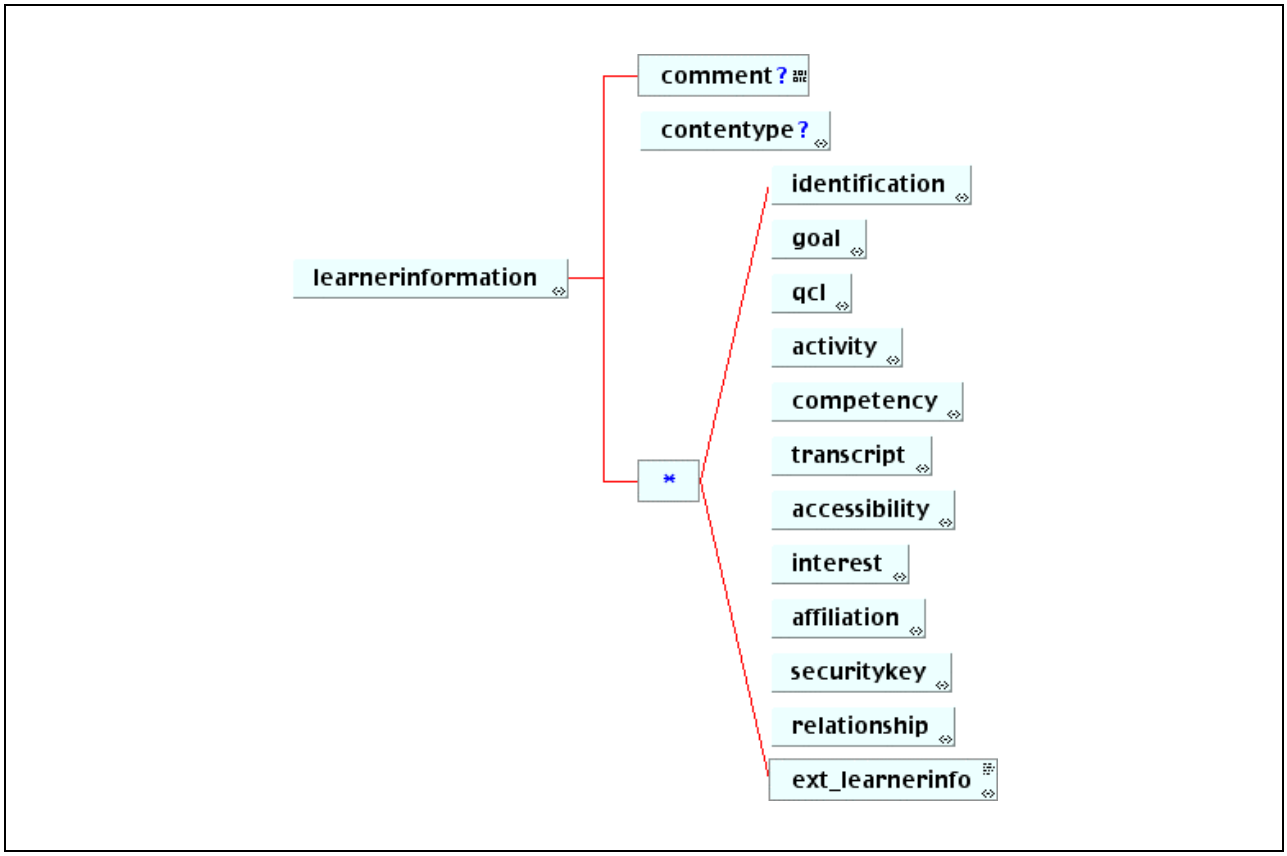

Figure 3.1 <learnerinformation> elements.

Multiplicity: The <learnerinformation> occurs only once in each XML instance file that is used to support Learner Information Package.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

Elements:

- comment
- contentype
- identification
- goal
- qcl
- activity
- competency
- transcript
- accessibility
- interest
- affiliation
- securitykey
- relationship
- ext_learnerinfo

3.1.1 <comment>

Description: This element contains the comments that are relevant to the structure as a whole.

Multiplicity: Occurs zero or once within the <learnerinformation> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.1.2 <contentype>

Description: Contains the content meta-data description concerning the index for the data, access rights and time-stamps.

Multiplicity: Occurs zero or once within the <learnerinformation> element.

Attributes: None.

3.1.3 <identification>

Description: The *identification* learner information contains all of the data for a specific individual or organisation. This includes data such as: name, address, contact information, agent, disability and demographics.

Multiplicity: Occurs zero or more times within the <learnerinformation> element.

Attributes: None.

3.1.4 <goal>

Description: The *goal* learner information consists of the description of the personal objectives and aspirations. These descriptions may also include information for monitoring the progress in achieving the goals. A goal can be defined in terms of sub-goals. A different 'goal' structure will be used for each entry.

Multiplicity: Occurs zero or more times within the <learnerinformation> element.

Attributes: None.

3.1.5 <qcl>

Description: The *qcl* learner information consists of the qualifications, certifications and licenses awarded to the learner i.e. the formally recognised products of their learning and work history. This includes information on the awarding body and may also include electronic copies of the actual documents. A different 'qcl' structure will be used for each qualification, etc.

Multiplicity: Occurs zero or more times within the <learnerinformation> element.

Attributes: None.

3.1.6 <activity>

Description: The *activity* learner information consists of the education/training, work and service (military, community, voluntary, etc.) record and products (excluding formal awards). This information may include the descriptions of the courses undertaken and the records of the corresponding assessment. A separate 'activity' structure will be used for each entry.

Multiplicity: Occurs zero or more times within the <learnerinformation> element.

Attributes: None.

3.1.7 <competency>

Description: The *competency* learner information consists of the descriptions of the skills the learner has acquired. These skills may be associated with some formal or informal training or work history (described in the 'activity')

and formal awards (described in the 'qcl'). The corresponding level of competency may also be defined. A different 'competency' structure will be used for each competency.

Multiplicity: Occurs zero or more times within the <learnerinformation> element.

Attributes: None.

3.1.8 <transcript>

Description: The *transcript* learner information is used to store the summary records of the academic performance at an institution. This information may contain an arbitrary level of detail and so there is no prescribed structure for a transcript.

Multiplicity: Occurs zero or more times within the <learnerinformation> element.

Attributes: None.

3.1.9 <accessibility>

Description: The *accessibility* learner information consists of the cognitive, technical and physical preferences for the learner, disability, eligibility and language capabilities. These describe the learner's capabilities to interact with the learning environment.

Multiplicity: Occurs zero or more times within the <learnerinformation> element.

Attributes: None.

3.1.10 <interest>

Description: The *interest* learner information consists of descriptions of the hobbies and other recreational activities. These interests may have formal awards (as described in the associated 'qcl'). Electronic versions of the products of these interests may also be contained. Each interest will be described within its own 'interest' structure.

Multiplicity: Occurs zero or more times within the <learnerinformation> element.

Attributes: None.

3.1.11 <affiliation>

Description: The *affiliation* learner information is used to store the descriptions of the organisation affiliations associated with the learner e.g. professional memberships. Affiliations for education groups e.g. classes, cohorts, etc. should be exchanged using the IMS Enterprise specification mechanism.

Multiplicity: Occurs zero or more times within the <learnerinformation> element.

Attributes: None.

3.1.12 <securitykey>

Description: The *securitykey* learner information is used to store the passwords, security codes, etc. to be used when communicating with the learner. A different 'securitykey' structure will be used for each key and class of key.

Multiplicity: Occurs zero or more times within the <learnerinformation> element.

Attributes: None.

3.1.13 <relationship>

Description: The *relationship* learner information is used to store the description of the relations between the other core data structures. All of the relationship information has been removed from the other structures to enable these to be collected at a single place.

Multiplicity: Occurs zero or more times within the <learnerinformation> element.

Attributes: None.

3.1.14 <ext_learnerinfo>

Description: This element contains the proprietary extensions to the <learnerinformation> element.

Multiplicity: Occurs zero or more times within the <learnerinformation> element.

Attributes: None.

3.2 <identification> Elements

Description: The information that is used to identify the learner is contained within this element. The structure of the <identification> element is such that there only needs to be a single instance within each <learnerinformation> element. The type of information included herein is names, addresses, contact information, demographics and representative agents.

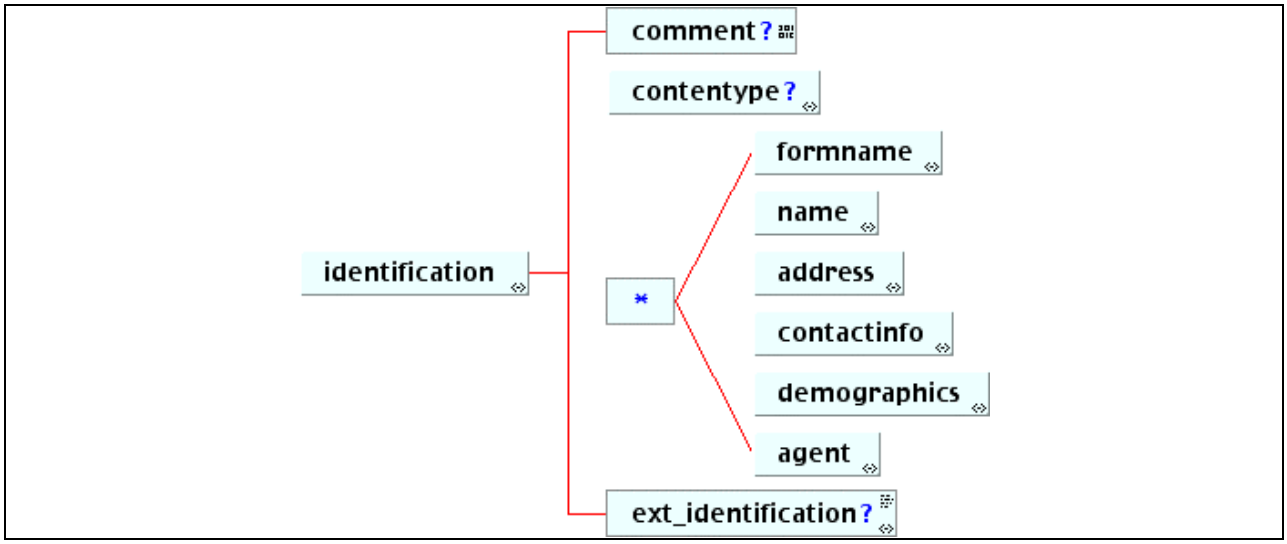

Figure 3.2 <identification> elements.

Multiplicity: Occurs zero or more times within the <learnerinformation> element. A single instance would be expected per transaction.

Attributes: None.

Elements:

- comment
- contentype
- formname
- name
- address
- contactinfo
- demographics
- agent
- ext_identification

3.2.1 <comment>

Description: This element contains the comments that are relevant to the <identification> structure.

Multiplicity: Occurs zero or once within the <identification> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.2.2 <contentype>

Description: Contains the content meta-data description concerning the index for the data, access rights and time-stamps.

Multiplicity: Occurs zero or once within the <identification> element.

Attributes: None.

3.2.3 <formname> Elements

Description: The formatted name is a single text field with the structure of the name defined as appropriate to the type of name e.g. maiden name, full name, etc. There is a different entry for each formatted name.

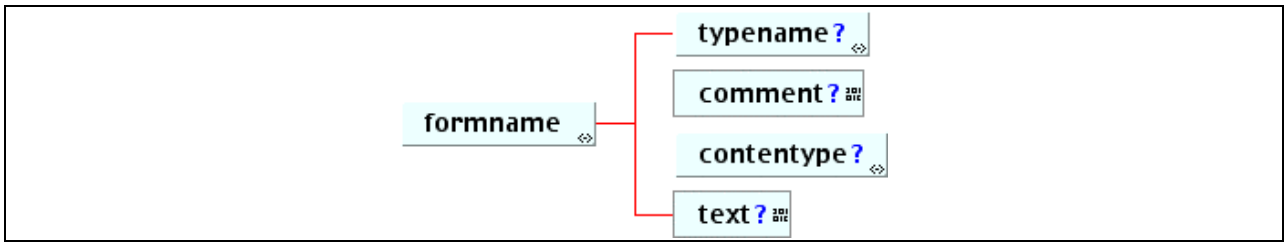

Figure 3.3 <formname> elements.

Multiplicity: Occurs zero or more times within the <identification> element.

Attributes: None.

Elements:

- typename
- comment
- contentype
- text

Example:

```
<formname>
    <typename>
        <tysource sourcetype="imsdefault"/>
        <tyvalue>Preferred</tyvalue>
    </typename>
    <contentype>
        <referential>
            <indexid>formname_01</indexid>
        </referential>
    </contentype>
    <text>Bob Dylan</text>
</formname>
```

3.2.3.1 <typename>

Description: This element presents the default vocabulary that is made available to identify the type of formatted name. If the standard vocabulary is insufficient then an alternative entry must be used through the <tysource> element.

Multiplicity: Occurs zero or once within the <formname> element.

Attributes: None.

3.2.3.2 <comment>

Description: This element contains the comments that are relevant to the formname structure.

Multiplicity: Occurs zero or once within the <formname> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.2.3.4 <contentype>

Description: Contains the content meta-data description concerning the index for the data, access rights and time-stamps.

Multiplicity: Occurs zero or once within the <formname> element.

Attributes: None.

3.2.3.5 <text>

Description: This is the actual formatted name. The entry is contained as a 'string'.

Multiplicity: Occurs zero or once within the <formname> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification.
  Data-type = string.
- **uri (optional).** Identifies the external reference that contains the information.
  Data-type = string.

3.2.4 <name> Elements

Description: The name of the learner supplied in composite fashion i.e. there is a distinct entry for each part of the name. There is a different entry for each name.

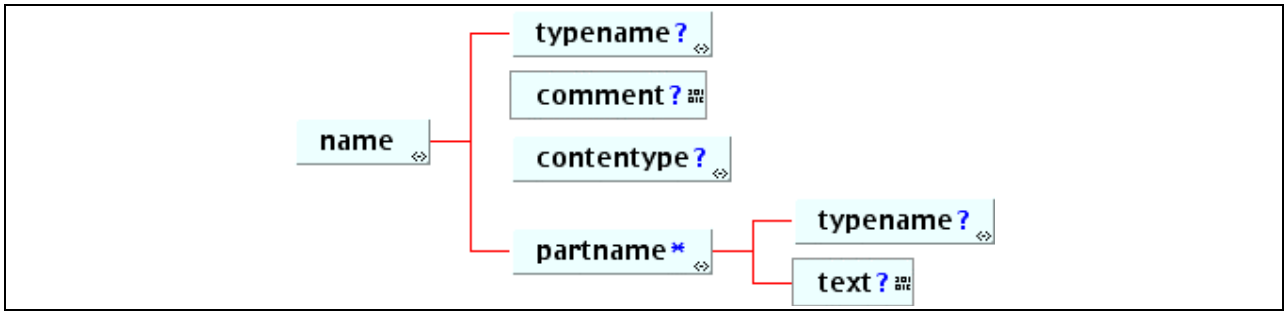

Figure 3.4 <name> elements.

Multiplicity: Occurs zero or more times within the <identification> element.

Attributes: None.

Elements:

- typename
- comment
- contentype
- partname
- text

Example:

```
<name>
    <typename>
        <tysource sourcetype="imsdefault"/>
        <tyvalue>Preferred</tyvalue>
    </typename>
    <contentype>
        <referential>
            <indexid>name_01</indexid>
        </referential>
    </contentype>
    <partname>
        <typename>
            <tysource sourcetype="imsdefault"/>
            <tyvalue>First</tyvalue>
        </typename>
        <text>Bob</text>
    </partname>
    <partname>
        <typename>
            <tysource sourcetype="imsdefault"/>
            <tyvalue>Last</tyvalue>
        </typename>
```

```
        <text>Dylan</text>
    </partname>
<name>
```

3.2.4.1 <typename>

Description: This element presents the default vocabulary that is made available to identify the type of name. If the standard vocabulary is insufficient then an alternative entry must be used through the <tysource> element.

Multiplicity: Occurs zero or once within the <name> element.

Attributes: None.

3.2.4.2 <comment>

Description: This element contains the comments that are relevant to the name structure.

Multiplicity: Occurs zero or once within the <name> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification.
  Data-type = string.

3.2.4.3 <contentype>

Description: Contains the content meta-data description concerning the index for the data, access rights and time-stamps.

Multiplicity: Occurs zero or once within the <name> element.

Attributes: None.

3.2.4.4 <partname>

Description: A part of the name of the learner. There is a different entry for each part of the name.

Multiplicity: Occurs zero or more times within the <name> element.

Attributes: None.

3.2.4.5 <typename>

Description: This element presents the default vocabulary that is made available to identify the type of part-name. If the standard vocabulary is insufficient then an alternative entry must be used through the <tysource> element.

Multiplicity: Occurs zero or once within the <partname> element.

Attributes: None.

3.2.4.6 <text>

Description: This is the actual part name. The entry is contained as a 'string'.

Multiplicity: Occurs once within the <partname> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification.
  Data-type = string.
- **uri (optional).** Identifies the external reference that contains the information.
  Data-type = string.

3.2.5 <address> Elements

Description: This element is used to contain the detailed address of the learner. The address is broken down into a very fine grain level. This format conforms to that used in vCard.

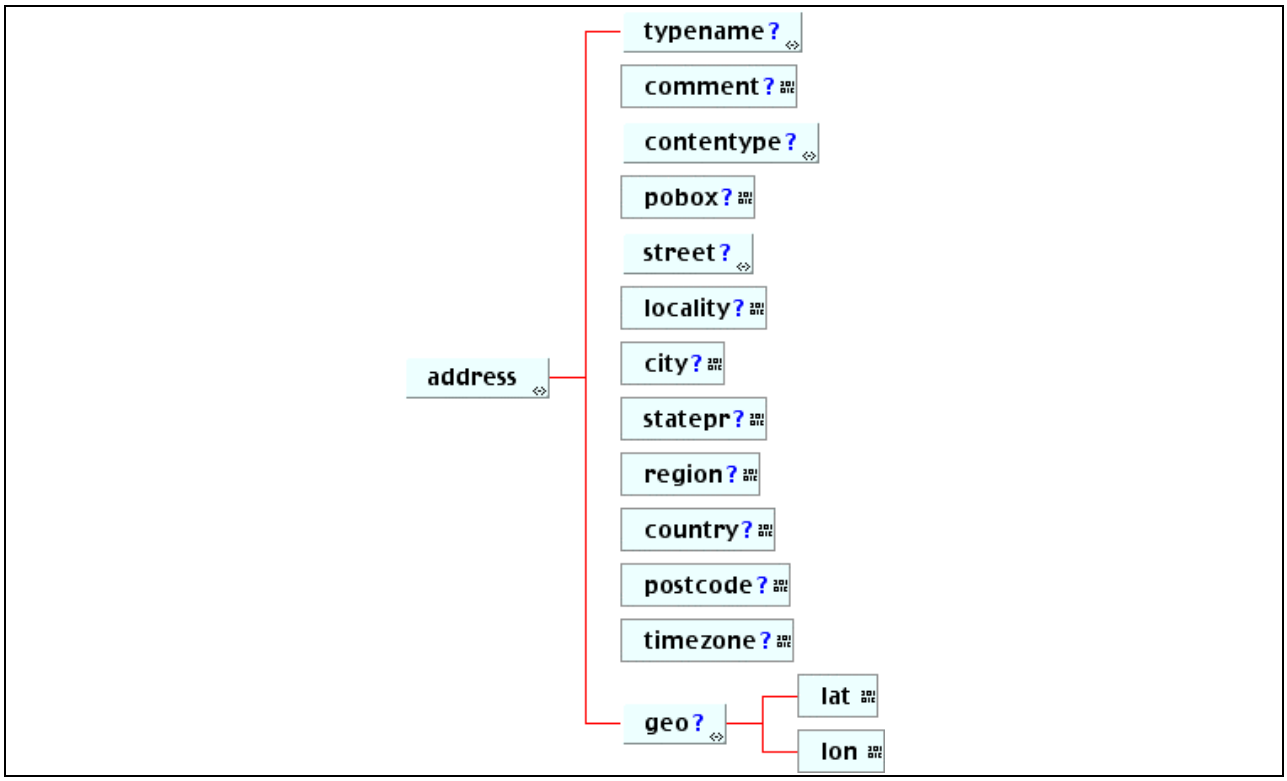

Figure 3.5 <address> elements.

Multiplicity: Occurs zero or more times within the <identification> element.

Attributes: None.

Elements:

- typename
- vocab
- comment
- contentype
- pobox
- street
- locality
- city
- statepr
- region
- country
- postcode
- timezone
- geo
- lat
- lon

Example:

```
<address>
    <typename>
        <tysource sourcetype="imsdefault"/>
        <tyvalue>Mailing</tyvalue>
    </typename>
    <contentype>
        <referential>
            <indexid>address_01</indexid>
        </referential>
    </contentype>
    <locality>Burlington</locality>
    <city>Delaware</city>
    <statepr>Massachusetts</statepr>
    <region>North East</region>
    <country>USA</country>
    <postcode></postcode>MA01803
    <timezone>EDT</timezone>
```

```
    <geo>
        <lat>90:25:59</lat>
        <lon>270:30:27</lon>
    </geo>
</address>
```

3.2.5.1 <typename>

Description: This element presents the default vocabulary that is made available to identify the type of address. If the standard vocabulary is insufficient then an alternative entry must be used through the <tysource> element.

Multiplicity: Occurs zero or once within the <address> element.

Attributes: None.

3.2.5.2 <comment>

Description: This element contains the comments that are relevant to the address structure.

Multiplicity: Occurs zero or once within the <address> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.2.5.3 <contentype>

Description: Contains the content meta-data description concerning the index for the data, access rights and time-stamps.

Multiplicity: Occurs zero or once within the <address> element.

Attributes: None.

3.2.5.4 <pobox>

Description: Contains the Post Office Box number of the address. The entry is contained as a 'string'.

Multiplicity: Occurs zero or once within the <address> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.2.5.5 <street> Elements

Description: This element contains the detailed content of the street part of the address. It is not required that every field is to be filled to produce a valid street address.

Multiplicity: Occurs zero or more times within the <address> element.

Attributes: None.

Elements:

- nonfieldedstreetaddress
- complex
- streetnumber
- streetprefix
- streetname
- streetype
- streetsuffix
- apttype
- aptnumprefix
- aptnumber
- aptnumsuffix

Example:

```
<street>
    <nonfieldedstreetaddress>34 St.Pauls Road</nonfieldedstreetaddress>
    <streetnumber>34</streetnumber>
```

```
    <streetprefix>St.</streetprefix>
    <streetname>Pauls</streetname>
    <streetype<Road</streetype>
</street>
```

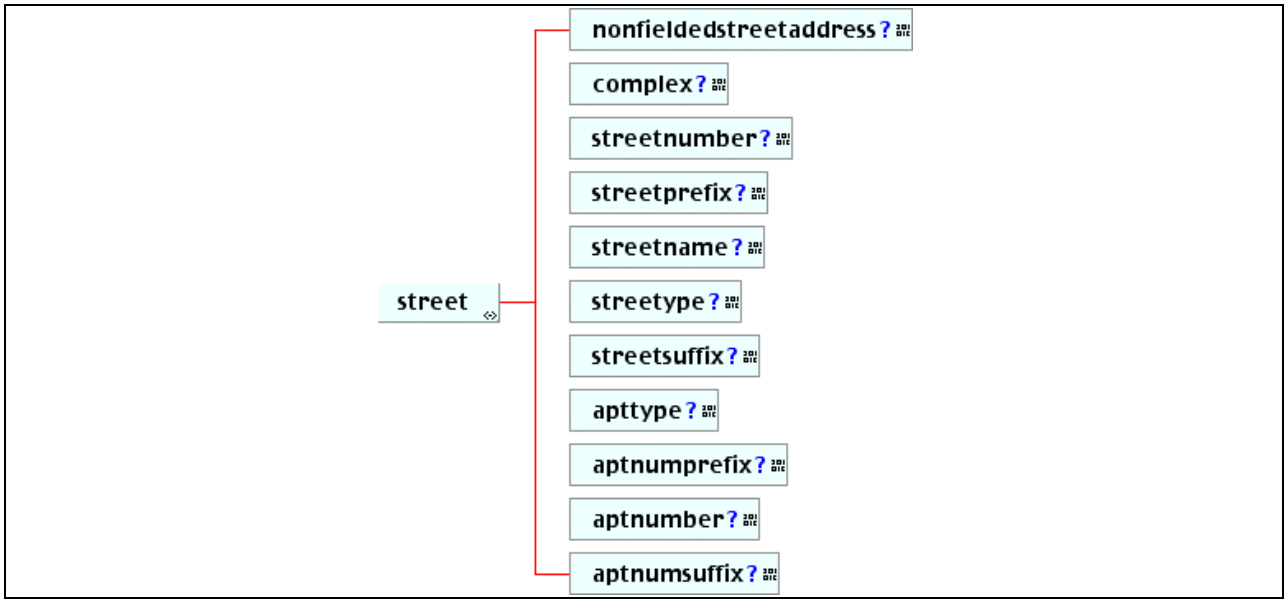

Figure 3.6 <street> elements.

3.2.5.6 <nonfieldedstreetaddress>

Description: Contains the full formatted street address. The entry is contained as a 'string'.

Multiplicity: Occurs zero or once within the <street> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.2.5.7 <complex>

Description: The name of the building complex. The entry is contained as a 'string'.

Multiplicity: Occurs zero or once within the <street> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.2.5.8 <streetnumber>

Description: The street number of the building. The entry is contained as a 'string'.

Multiplicity: Occurs zero or once within the <street> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.2.5.9 <streetprefix>

Description: The prefix to the street name e.g. 'St.'. The entry is contained as a 'string'.

Multiplicity: Occurs zero or once within the <street> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.2.5.10 <streetname>

Description: The street name itself. The entry is contained as a 'string'.

Multiplicity: Occurs zero or once within the <street> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.2.5.11 <streetype>

Description: The type of street e.g. Road, Avenue, Square, etc. The entry is contained as a 'string'.

Multiplicity: Occurs zero or once within the <street> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.2.5.12 <streetsuffix>

Description: The suffix to the street name. The entry is contained as a 'string'.

Multiplicity: Occurs zero or once within the <street> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.2.5.13 <apttype>

Description: The type of apartment. The entry is contained as a 'string'.

Multiplicity: Occurs zero or once within the <street> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.2.5.14 <aptnumprefix>

Description: The prefix to the apartment number. The entry is contained as a 'string'.

Multiplicity: Occurs zero or once within the <street> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.2.5.15 <aptnumber>

Description: The apartment number within the building. The entry is contained as a 'string'.

Multiplicity: Occurs zero or once within the <street> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.2.5.16 <aptnumsuffix>

Description: The suffix to the apartment number e.g. 'A'. The entry is contained as a 'string'.

Multiplicity: Occurs zero or once within the <street> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.2.5.17 <locality>

Description: The community within the city. The entry is contained as a 'string'.

Multiplicity: Occurs zero or once within the <street> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.2.5.18 <city>

Description: The city name. The entry is contained as a 'string'.

Multiplicity: Occurs zero or once within the <street> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.2.5.19 <statepr>

Description: The state or province name e.g. California. The entry is contained as a 'string'.

Multiplicity: Occurs zero or once within the <street> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.2.5.20 <region>

Description: The geographical region e.g. Europe. The entry is contained as a 'string'.

Multiplicity: Occurs zero or once within the <street> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.2.5.21 <country>

Description: The country name e.g. Japan. The entry is contained as a 'string'.

Multiplicity: Occurs zero or once within the <street> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.2.5.22 <postcode>

Description: The post or zip code. The entry is contained as a 'string'.

Multiplicity: Occurs zero or once within the <street> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.2.5.23 <timezone>

Description: The time-zone e.g. GMT, EDT, etc. The entry is contained as a 'string'.

Multiplicity: Occurs zero or once within the <street> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.2.5.24 <geo>

Description: The latitude and longitude of the location.

Multiplicity: Occurs zero or once within the <street> element.

Attributes: None.

3.2.5.25 <lat>

Description: The latitude of the building identified by the address. The format is 'AB.MN.XY N/S> where AB is the degrees (0-90), MN is the number of minutes (0-59), XY is the number of seconds (0-59) and N/S is either [N]orth or [S]outh. The entry is contained as a 'string'.

Multiplicity: Occurs zero or once within the <street> element.

Attributes: None.

3.2.5.26 <lon>

Description: The longitude of the building identified by the address. The format is 'ABC.MN.XY E/W> where ABC is the degrees (0-359), MN is the number of minutes (0-59), XY is the number of seconds (0-59) and E/W is either [E]ast or [W]est. The entry is contained as a 'string'.

Multiplicity: Occurs zero or once within the <street> element.

Attributes: None.

3.2.6 <contactinfo> Elements

Description: The contact information describes the electronic address to be used when contacting the learner. These electronic addresses include telephone, facsimile, pager and mobile numbers, plus the email address and web page reference.

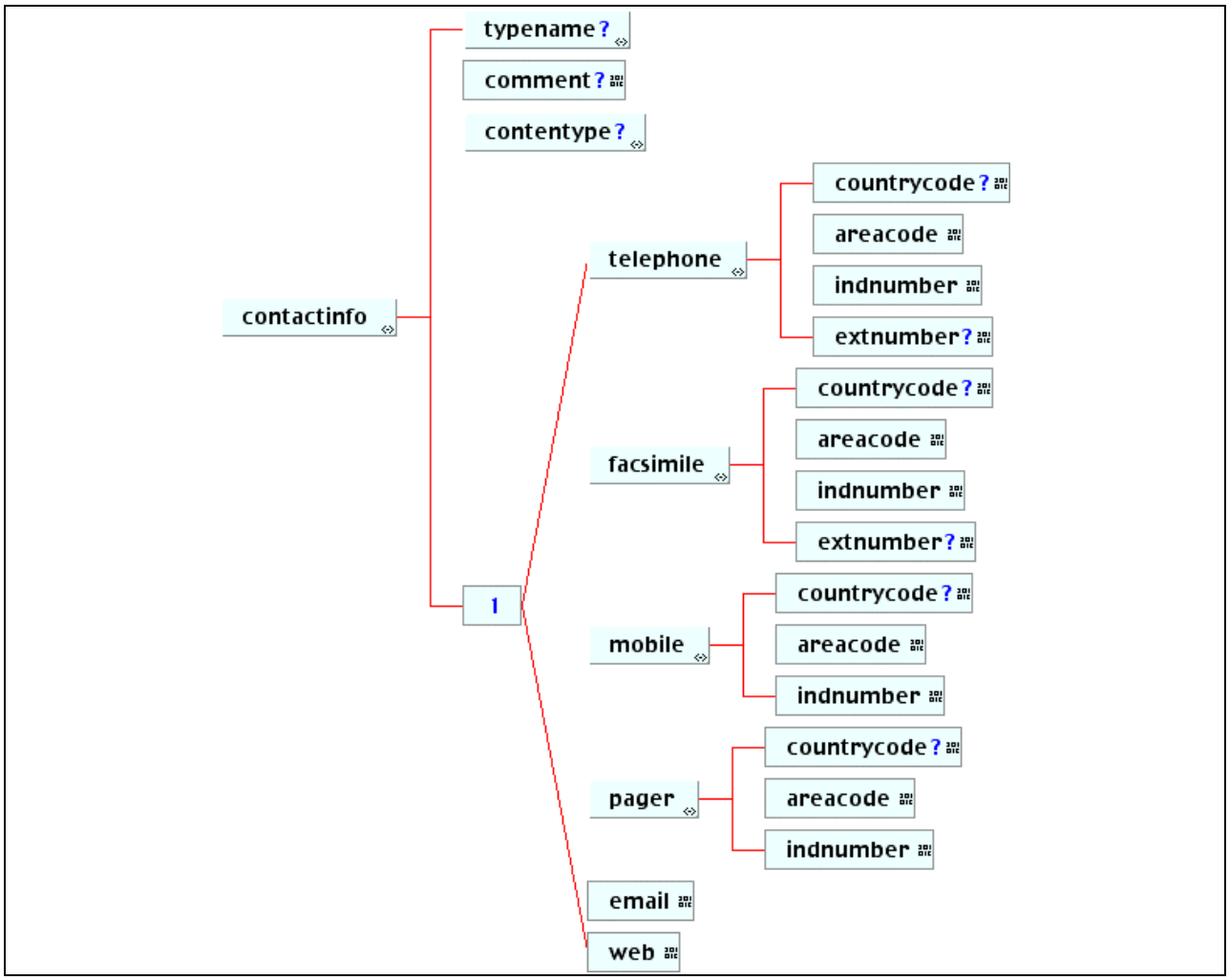

Figure 3.7 <contactinfo> elements.

Multiplicity: Occurs zero or more times within the <identification> element.

Attributes: None.

Elements:

- typename
- comment
- contentype
- telephone
- facsimile
- mobile
- pager
- countrycode
- areacode
- indnumber
- extnumber
- email
- web

Example:

```
<contactinfo>
    <typename>
        <tysource sourcetype="imsdefault"/>
        <tyvalue>Private</tyvalue>
```

```
    </typename>
    <contentype>
        <referential>
            <indexid>contactinfo_01</indexid>
        </referential>
    </contentype>
    <telephone>
        <countrycode>44</countrycode>
        <areacode>020</areacode>
        <indnumber>6472239</indnumber>
    </telephone>
</contactinfo>
```

3.2.6.1 <typename>

Description: This element presents the default vocabulary that is made available to identify the type of contact information. If the standard vocabulary is insufficient then an alternative entry must be used through the <tysource> element.

Multiplicity: Occurs zero or once within the <contactinfo> element.

Attributes: None.

3.2.6.2 <comment>

Description: This element contains the comments that are relevant to the contactinfo structure.

Multiplicity: Occurs zero or once within the <contactinfo> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.2.6.3 <contentype>

Description: Contains the content meta-data description concerning the index for the data, access rights and time-stamps.

Multiplicity: Occurs zero or once within the <contactinfo> element.

Attributes: None.

3.2.6.4 <telephone>

Description: The telephone number.

Multiplicity: Occurs zero or once within the <contactinfo> element.

Attributes: None.

Elements:

- countrycode
- areacode
- indnumber
- extnumber

3.2.6.5 <facsimile>

Description: The facsimile number.

Multiplicity: Occurs zero or once within the <contactinfo> element.

Attributes: None.

Elements:

- countrycode
- areacode
- indnumber
- extnumber

3.2.6.6 <mobile>

Description: The mobile telephone number.

Multiplicity: Occurs zero or once within the <contactinfo> element.

Attributes: None.

Elements:

- countrycode
- areacode
- indnumber

3.2.6.7 <pager>

Description: The pager number.

Multiplicity: Occurs zero or once within the <contactinfo> element.

Attributes: None.

Elements:

- countrycode
- areacode
- indnumber

3.2.6.8 <countrycode>

Description: The country code for the <telephone>, <facsimile>, <mobile> and <pager> elements. The entry is a string.

Multiplicity: Occurs zero or once within the <telephone>, <facsimile>, <mobile> and <pager> elements.

Attributes: None.

3.2.6.9 <areacode>

Description: The area code for the <telephone>, <facsimile>, <mobile> and <pager> elements. The entry is a string.

Multiplicity: Occurs once within the <telephone>, <facsimile>, <mobile> and <pager> elements.

Attributes: None.

3.2.6.10 <indnumber>

Description: The number for the <telephone>, <facsimile>, <mobile> and <pager> elements. The entry is a string.

Multiplicity: Occurs once within the <telephone>, <facsimile>, <mobile> and <pager> elements.

Attributes: None.

3.2.6.11 <extnumber>

Description: The extension number for the <telephone> and <facsimile> elements. The entry is a string.

Multiplicity: Occurs zero or once within the <telephone> and <facsimile> elements.

Attributes: None.

3.2.6.12 <email>

Description: An email address of the learner. The entry is a string.

Multiplicity: Occurs zero or once within the <contactinfo> element.

Attributes: None.

3.2.6.13 <web>

Description: A web address for the learner. The entry is a string.

Multiplicity: Occurs zero or once within the <contactinfo> element.

Attributes: None.

3.2.7 <demographics> Elements

Description: The demographics element contains the information that is used to describe the type of learner e.g. gender, date of birth, etc.

Multiplicity: Occurs zero or more times within the <identification> element.

Attributes: None.

Elements:

- typename
- comment
- contentype
- representation
- date
- description
- gender
- placeofbirth
- uid

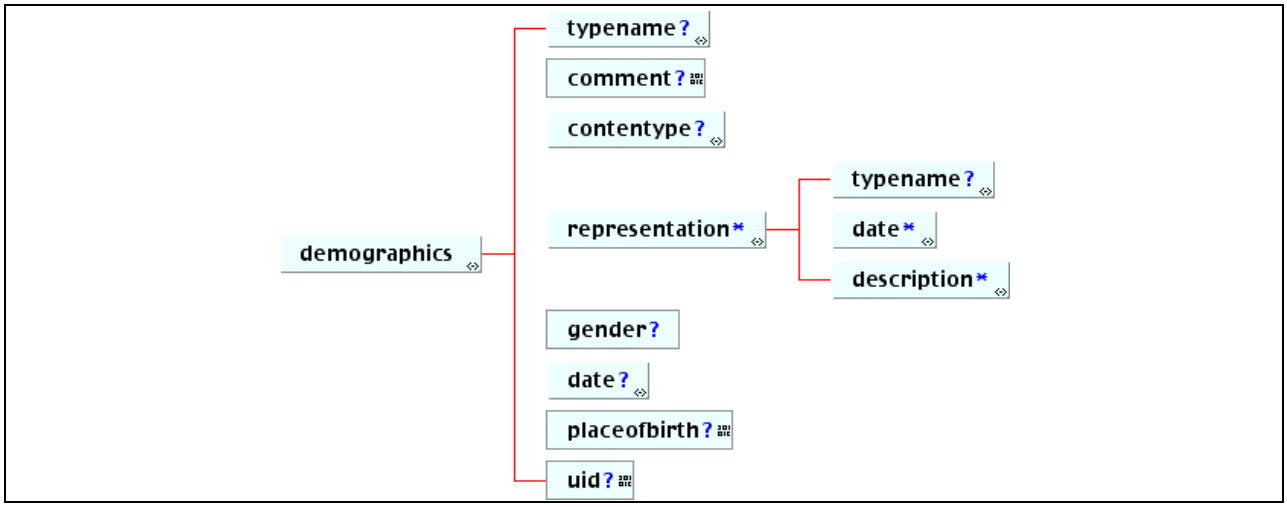

Figure 3.8 <demographics> elements.

Example:

```
<demographics>
    <typename>
        <tysource sourcetype="imsdefault"/>
        <tyvalue>Adult</tyvalue>
    </typename>
    <contentype>
        <referential>
            <indexid>demographics_01</indexid>
        </referential>
    </contentype>
    <representation>
        <typename>
            <tysource sourcetype="imsdefault"/>
            <tyvalue>Photo</tyvalue>
        </typename>
        <description>
            <full>
                <media mediamode="Image" encoding="uri">learnerid/photo.gif</media>
            </full>
        </description>
    </representation>
    <gender gender="Male"/>
    <date>
        <typename>
            <tysource sourcetype="imsdefault"/>
            <tyvalue>Birth</tyvalue>
        </typename>
        <datetime>1901:04:01</datetime>
    </date>
    <placeofbirth>Texas</placeofbirth>
</demographics>
```

3.2.7.1 <typename>

Description: This element presents the default vocabulary that is made available to identify the type of demographics information. If the standard vocabulary is insufficient then an alternative entry must be used through the <tysource> element.

Multiplicity: Occurs zero or once within the <demographics> element.

Attributes: None.

3.2.7.2 <comment>

Description: This element contains the comments that are relevant to the demographics structure.

Multiplicity: Occurs zero or once within the <demographics> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.2.7.3 <contentype>

Description: Contains the content meta-data description concerning the index for the data, access rights and time-stamps.

Multiplicity: Occurs zero or once within the <demographics> element.

Attributes: None.

3.2.7.4 <representation>

Description: The representation of the learner e.g. their photograph, voice print, etc.

Multiplicity: Occurs zero or more times within the <demographics> element.

Attributes: None.

Elements:

- typename
- date
- description

3.2.7.5 <typename>

Description: This element presents the default vocabulary that is made available to identify the type of representation information. If the standard vocabulary is insufficient then an alternative entry must be used through the <tysource> element.

Multiplicity: Occurs zero or once within the <representation> element.

Attributes: None.

3.2.7.6 <date>

Description: The store for significant dates relevant to the <demographics> and <representation> information.

Multiplicity: Occurs zero or once within the <demographics> and <representation> elements.

Attributes: None.

3.2.7.7 <description>

Description: Contains the content materials that are used to describe the demographics listed in the associated data.

Multiplicity: Occurs zero or once within the <demographics> element.

Attributes: None.

3.2.7.8 <gender>

Description: Contains the place of birth of the learner - the granularity of the information is usage dependent.

Multiplicity: Occurs zero or once within the <demographics> element.

Attributes:

- **gender (required selection from the enumerated list of: Male, Female, NA).** Identifies the gender of the learner. This list is to be used as the base set of options.
  Data-type = Enumerated list.

3.2.7.9 <placeofbirth>

Description: Contains the place of birth of the learner - the granularity of the information is usage dependent. The entry format is a string.

Multiplicity: Occurs zero or once within the <demographics> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification.
  Data-type = string.

3.2.7.10 <uid>

Description: Contains a user identifier for the learner e.g. social security number. The entry format is a string.

Multiplicity: Occurs zero or once within the <demographics> element.

Attributes: None.

3.2.8 <agent> Elements

Description: The agent element is used to contain the information that describes the ways in which an individual or organisations can act as representatives for the learner. The agents could be a parent, guardian, etc. and the roles they undertake could be aide, legal, medical, etc.

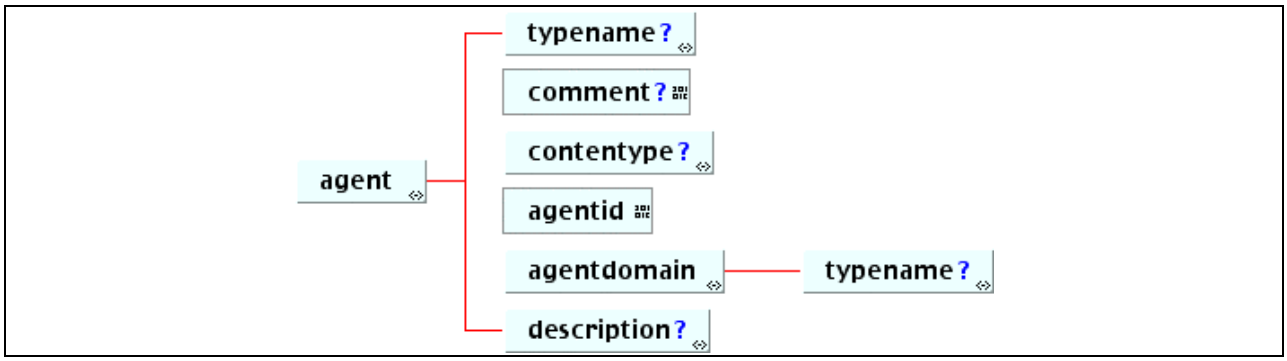

Figure 3.9 <agent> elements.

Multiplicity: Occurs zero or more times within the <identification> element.

Attributes: None.

Elements:

- typename
- comment
- contentype
- agentid
- agentdomain
- description

Example:

```
<agent>
    <typename>
        <tysource sourcetype="imsdefault"/>
        <tyvalue>Tutor</tyvalue>
    </typename>
    <contentype>
        <referential>
            <indexid>agent_01</indexid>
        </referential>
    </contentype>
    <agentid>Dr.Wason</agentid>
    <agentdomain>
        <typename>
            <tysource sourcetype="imsdefault"/>
            <tyvalue>Educational</tyvalue>
        </typename>
    </agentdomain>
    <description>
        <short>Course tutor</short>
    </description>
</agent>
```

3.2.8.1 <typename>

Description: This element presents the default vocabulary that is made available to identify the type of agent information. If the standard vocabulary is insufficient then an alternative entry must be used through the <tysource> element.

Multiplicity: Occurs zero or once within the <identification> element.

Attributes: None.

3.2.8.2 <comment>

Description: This element contains the comments that are relevant to the agent structure.

Multiplicity: Occurs zero or once within the <agent> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.2.8.3 <contentype>

Description: Contains the content meta-data description concerning the index for the data, access rights, time-stamps and IMS Meta-data.

Multiplicity: Occurs zero or once within the <agent> element.

Attributes: None.

3.2.8.4 <agentid>

Description: The identifier for the agent. The entry format is a string.

Multiplicity: Occurs once within the <agent> element.

Attributes: None.

3.2.8.5 <agentdomain>

Description: The role that the agent undertakes on behalf of the learner.

Multiplicity: Occurs once within the <agent> element.

Attributes: None.

Elements:

- typename
- description

3.2.8.6 <typename>

Description: This element presents the default vocabulary that is made available to identify the type of agent domain information. If the standard vocabulary is insufficient then an alternative entry must be used through the <tysource> element.

Multiplicity: Occurs zero or once within the <agentdomain> element.

Attributes: None.

3.2.8.7 <description>

Description: Contains the content materials that are used to describe the agent listed in the associated data.

Multiplicity: Occurs zero or once within the <agent> element.

Attributes: None.

3.2.9 <ext_identification>

Description: This element contains the proprietary extensions to the <identification> element.

Multiplicity: Occurs zero or once within the <identification> element.

Attributes: None

3.3 <goal> Elements

Description. The *goal* learner information consists of the description of the personal objectives and aspirations. These descriptions may also include information for monitoring the progress in achieving the goals. A goal can be defined in terms of sub-goals. A different 'goal' structure will be used for each entry.

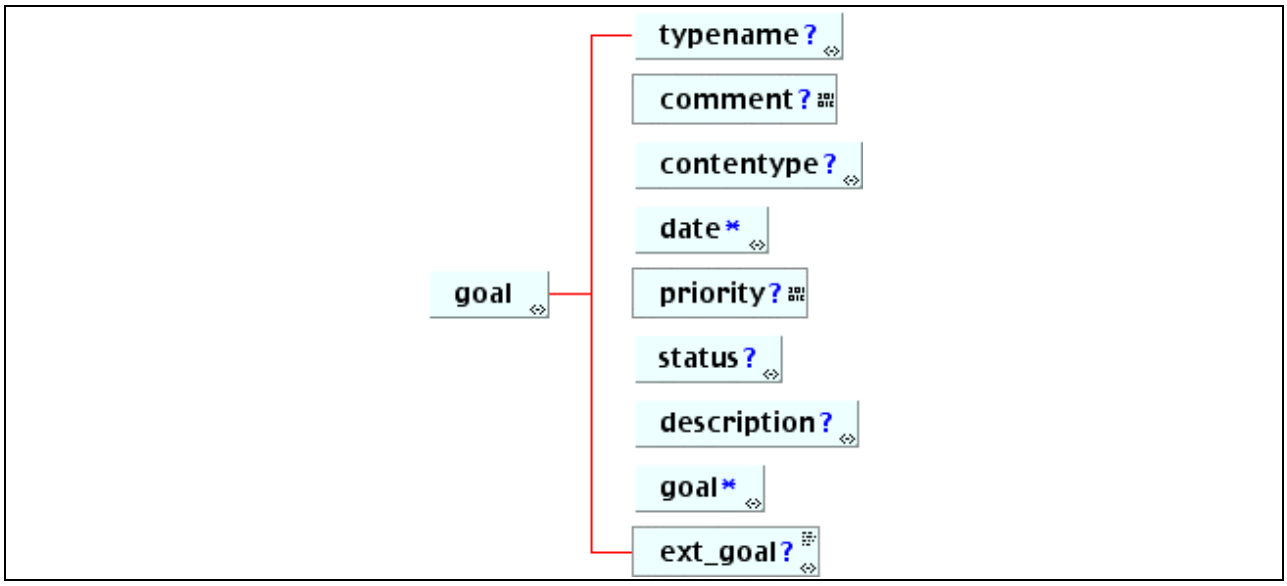

Figure 3.10 <goal> elements.

Multiplicity: Occurs zero or more within the <learnerinformation> element.

Attributes: None.

Elements:

- typename
- comment
- contentype
- date
- priority
- status
- description
- ext_goal

Example:

```
<goal>
    <typename>
        <tysource sourcetype="imsdefault"/>
        <tyvalue>Education</tyvalue>
    </typename>
    <contentype>
        <referential>
            <indexid>goal_01</indexid>
        </referential>
    </contentype>
    <priority>Primary</priority>
    <description>
        <short>The primary goal.<short>
    <description>
    <goal>
        <typename>
            <tysource sourcetype="imsdefault"/>
            <tyvalue>Education</tyvalue>
        </typename>
        <contentype>
            <referential>
                <indexid>goal_01_subgoal_01</indexid>
            </referential>
        </contentype>
        <description>
            <short>The first sub-goal of the primary goal.<short>
```

```
        <description>
    </goal>
</goal>
```

3.3.1 <typename>

Description: This element presents the default vocabulary that is made available to identify the type of goal information. If the standard vocabulary is insufficient then an alternative entry must be used through the <tysource> element.

Multiplicity: Occurs zero or once within the <goal> element.

Attributes: None.

3.3.2 <comment>

Description: This element contains the comments that are relevant to the goal structure.

Multiplicity: Occurs zero or once within the <goal> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.3.3 <contentype>

Description: Contains the content meta-data description concerning the index for the data, access rights and time-stamps.

Multiplicity: Occurs zero or once within the <goal> element.

Attributes: None.

3.3.4 <date>

Description: The store significant dates relevant to the goal e.g. date of creation, target date for completion, etc. Each goal will tend to have several relevant dates.

Multiplicity: Occurs once or many times within the <goal> element.

Attributes: None.

3.3.5 <priority>

Description: A goal may have a priority assigned to it. This priority can be used to show the relevance importance between goals defined at the same level of the hierarchy. Each goal can have a single priority.

Multiplicity: Occurs zero or once within the <goal> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.3.6 <status>

Description: A goal can have an associated status e.g. Active, Complete, etc. A goal may have more than one status depending on the aims and objectives of the goal.

Multiplicity: Occurs zero or once within the <goal> element.

Attributes: None.

3.3.7 <description>

Description: Contains the content materials that are used to describe the goals presented in the associated data.

Multiplicity: Occurs zero or once within the <goal> element.

Attributes: None.

3.3.8 <goal>

Description: This structure allows a goal to have sub-goals and in turn those sub-goals can have sub-goals. This allows the construction of hierarchically related goals.

Multiplicity: Occurs once or many times within the <goal> element.

Attributes: None.

3.3.9 <ext_goal>

Description: This element contains the proprietary extensions to the <goal> element.

Multiplicity: Occurs zero or once within the <goal> element.

Attributes: None.

3.4 <qcl > Elements

Description: The *qcl* learner information consists of the qualifications, certifications and licenses awarded to the learner i.e. the formally recognised products of their learning and work history. This includes information on the awarding body and may also include electronic copies of the actual documents. A different 'qcl' structure will be used for each qualification, etc.

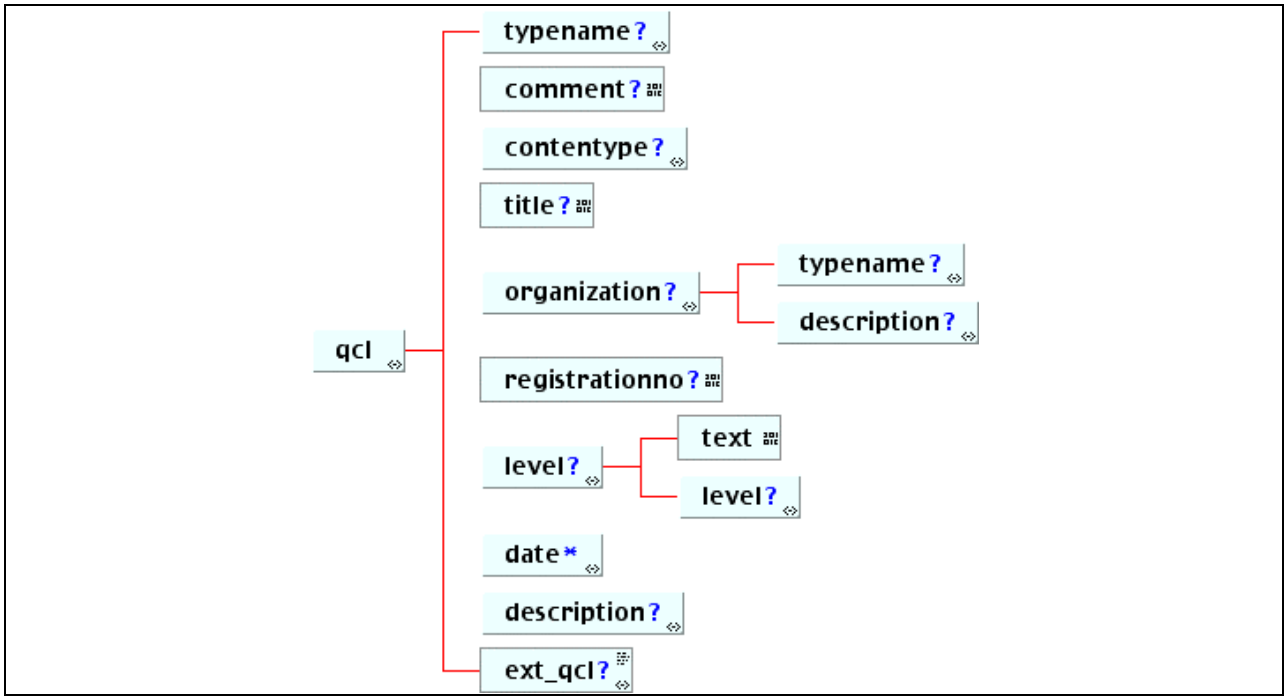

Figure 3.11 <qcl> elements.

Multiplicity: Occurs zero or more within the <learnerinformation> element.

Attributes: None.

Elements:

- typename
- comment
- contentype
- title
- organization
- registrationno
- level
- date
- description
- ext_qcl

Example:

```
<qcl>
    <typename>
        <tysource sourcetype="imsdefault"/>
        <tyvalue>Qualification</tyvalue>
    </typename>
    <contentype>
        <indexid>qcl_01</indexid>
    </contentype>
    <title>Microsoft Certified Engineer</title>
    <organization>
        <typename>
            <tysource sourcetype="imsdefault"/>
            <tyvalue>Training</tyvalue>
        </typename>
        <description>
            <short>The Training Institute</short>
        </description>
    </organization>
```

```
    <registrationno>35692348</registrationno>
    <level>
        <test>Trainer</text>
    <date>
        <typename>
            <tysource sourcetype="imsdefault"/>
            <tyvalue>Award</tyvalue>
        </typename>
        <datetime>2000:11:06</datetime>
    </date>
</qcl>
```

3.4.1 <typename>

Description: This element presents the default vocabulary that is made available to identify the type of QCL information. If the standard vocabulary is insufficient then an alternative entry must be used through the <tysource> element.

Multiplicity: Occurs zero or once within the <qcl> element.

Attributes: None.

3.4.2 <comment>

Description: This element contains the comments that are relevant to the qcl structure.

Multiplicity: Occurs zero or once within the <qcl> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.4.3 <contentype>

Description: Contains the content meta-data description concerning the index for the data, access rights and time-stamps.

Multiplicity: Occurs zero or once within the <qcl> element.

Attributes: None.

3.4.4 <title>

Description: The title of the qualification, certification or licence. The title would normally be printed the paper version of the qcl.

Multiplicity: Occurs once (mandatory) within the <qcl> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.4.5 <organization>

Description: This is the name of the organisation responsible for awarding the qualification, certification or licence e.g. the name of the university, professional body, etc.

Multiplicity: Occurs zero or once within the <qcl> element.

Attributes: None.

3.4.6 <registrationno>

Description: This is used to contain the reference number assigned to the qualification, certification or license. This number would normally be assigned by the awarding agency and would be used to uniquely identify the award. Entry format is a string.

Multiplicity: Occurs zero or once within the <qcl> element.

Attributes: None.

3.4.7 <level> Elements

Description: This is a quantification of the level of the award e.g. First Class, Distinction, etc. The recursive definition allows the description of hierarchical levels.

Multiplicity: Occurs zero or once within the <qcl> element.

Attributes: None.

Elements:

- text
- level

3.4.7.1 <level> Elements

Description: This is a quantification of the level of the award e.g. First Class, Distinction, etc. The recursive definition allows the description of hierarchical levels.

Multiplicity: Occurs zero or once within the <level> element.

Attributes: None.

3.4.7.2 <text>

Description: This is the text containing the level of the award itself. The entry is contained as a 'string'.

Multiplicity: Occurs once within the <level> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.4.8 <date>

Description: The store significant dates relevant to the qcl e.g. date of attainment, date of expiry, etc. Each qcl will typically have several relevant dates.

Multiplicity: Occurs once or many times within the <qcl> element.

Attributes: None.

3.4.9 <description>

Description: Contains the content materials that are used to describe the qualification, certification or licence presented in the associated data.

Multiplicity: Occurs zero or once within the <qcl> element.

Attributes: None.

3.4.10 <ext_qcl>

Description: This element contains the proprietary extensions to the <qcl> element.

Multiplicity: Occurs zero or once within the <qcl> element.

Attributes: None.

3.5 <activity> Elements

Description. The *activity* learner information consists of the education/training, work and service (military, community, voluntary, etc.) record and products (excluding formal awards). This information may include the descriptions of the courses undertaken and the records of the corresponding assessment. A separate 'activity' structure will be used for each entry.

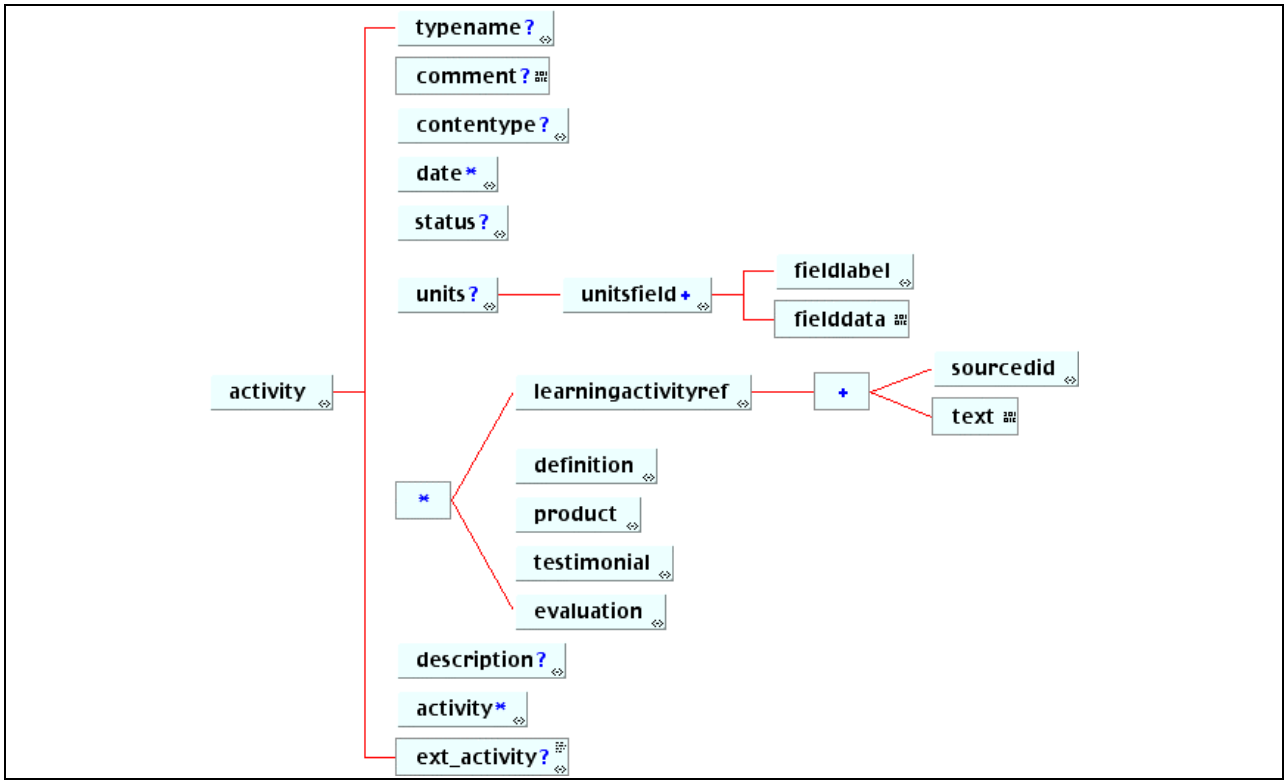

Figure 3.12 <activity> elements.

Multiplicity: Occurs zero or more within the <learnerinformation> element.

Attributes: None.

Elements:

- typename
- comment
- contentype
- date
- status
- units
- learningactivityref
- definition
- product
- testimonial
- evaluation
- description
- ext_activity

Example:

```
<activity>
    <typename>
        <tysource sourcetype="imsdefault"/>
        <tyvalue>Education</tyvalue>
    </typename>
    <contentype>
        <referential>
            <indexid>activity_01</indexid>
        </referential>
    </contentype>
    <date>
        <typename>
```

```
            <tysource sourcetype="imsdefault"/>
            <tyvalue>Finish</tyvalue>
        </typename>
        <datetime>2000:11:06</datetime>
    </date>
    <status>
        <typename>
            <tysource sourcetype="imsdefault"/>
            <tyvalue>Complete</tyvalue>
        </typename>
    </status>
    <units>
        <unitsfield>
            <fieldlabel>
                <typename><tyvalue>credits</tyvalue></typename>
            </fieldlabel>
            <fielddata>2</fielddata>
        </unitsfield>
    </units>
    <description>
        <short>Credit assignment for the course</short>
    </description>
</activity>
```

3.5.1 <typename>

Description: This element presents the default vocabulary that is made available to identify the type of activity information. If the standard vocabulary is insufficient then an alternative entry must be used through the <tysource> element.

Multiplicity: Occurs zero or once within the <activity> element.

Attributes: None.

3.5.2 <comment>

Description: This element contains the comments that are relevant to the activity structure.

Multiplicity: Occurs zero or once within the <activity> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.5.3 <contentype>

Description: Contains the content meta-data description concerning the index for the data, access rights and time-stamps.

Multiplicity: Occurs zero or once within the <activity> element.

Attributes: None.

3.5.4 <date>

Description: The store significant dates relevant to the activity e.g. date of attainment, date of expiry, etc. Each activity will tend to have several relevant dates.

Multiplicity: Occurs once or many times within the <activity> element.

Attributes: None.

3.5.5 <status>

Description: An activity can have an associated status e.g. Active, Complete, etc.

Multiplicity: Occurs zero or once within the <activity> element.

Attributes: None.

3.5.6 <units> Elements

Description: The credits or other equivalent measures that are assigned to the evaluation.

Multiplicity: Occurs zero or once within the <activity> element.

Attributes: None.

Elements:
- unitsfield

3.5.6.1 <unitsfield>

Description: The container for the quantification of the units assigned to this evaluation.

Multiplicity: Occurs zero or once within the <units> element.

Attributes: None.

3.5.6.2 <fieldlabel>

Description: The vocabulary used to identify the type of unit.

Multiplicity: Occurs once within the <unitsfield> element.

Attributes: None.

3.5.6.3 <fielddata>

Description: The actual value entry for the data field.

Multiplicity: Occurs once within the <unitsfield> element.

Attributes: None.

3.5.7 <learningactivityref> Elements

Description: An external reference to the learning activity being detailed. This reference could be used in several different contexts e.g. to provide the course description for an associated evaluation, to reference an external evaluation for included testimonial, etc.

Multiplicity: Occurs zero or more times within the <activity> element.

Attributes: None.

Elements:
- sourcedid
- text

Example:

```
<learneractivityref>
    <sourcedid>
        ,source>IMS_LIP_V1p0_Example</source>
        <id>course_101</id>
    </sourcedid>
</learneractivityref>
```

3.5.7.1 <sourcedid>

Description: The globally unique sourcedid for the learning activity.

Multiplicity: Occurs once within the <learningactivityref> element.

Attributes: None.

3.5.7.2 <text>

Description: A text description of the learning activity being referenced.

Multiplicity: Occurs zero or once within the <learningactivityref> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.5.8 <definition> Elements

Description: This element is used to store the description of the course materials that have been studied as part of the activity. A recursive structure is used and so complex course descriptions can be supported based upon an arbitrary number of sub-course structures.

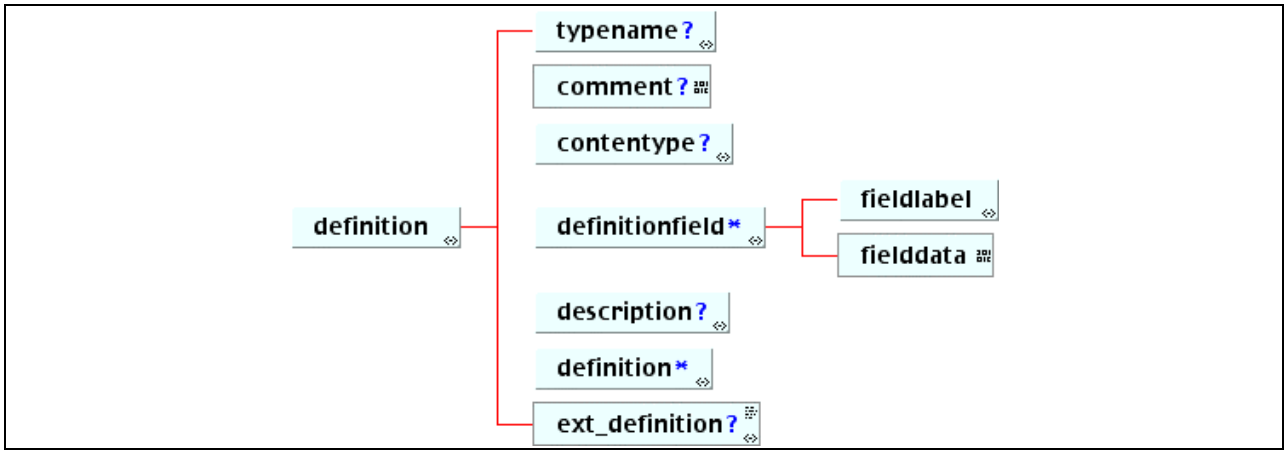

Figure 3.13 <definition> elements.

Multiplicity: Occurs zero or more times within the <activity> element.

Attributes: None.

Elements:

- typename
- comment
- contentype
- definitionfield
- description
- ext_definition

Example:

```
<definition>
    <typename>
        <tysource sourcetype="imsdefault"/>
        <tyvalue>Course</tyvalue>
    </typename>
    <contentype>
        <referential>
            <indexid>definition_01</indexid>
        </referential>
    </contentype>
    <definitionfield>
        <fieldlabel>
            <typename><tyvalue>Lecture_1</tyvalue></typename>
        </fieldlabel>
        <fielddata>Plant Structure</fielddata>
    <definitionfield>
    <definitionfield>
        <fieldlabel>
            <typename><tyvalue>Lecture_2</tyvalue></typename>
        </fieldlabel>
        <fielddata>Photosynthesis</fielddata>
    <definitionfield>
    <definitionfield>
```

```
        <fieldlabel>
            <typename><tyvalue>Lecture_3</tyvalue></typename>
        </fieldlabel>
        <fielddata>Plant Genetics</fielddata>
    <definitionfield>
    <description>
        <short>A course on plant biology</short>
    </description>
</definition>
```

3.5.8.1 <typename>

Description: This element presents the default vocabulary that is made available to identify the type of definition information. If the standard vocabulary is insufficient then an alternative entry must be used through the <tysource> element.

Multiplicity: Occurs zero or once within the <definition> element.

Attributes: None.

3.5.8.2 <comment>

Description: This element contains the comments that are relevant to the structure as a whole.

Multiplicity: Occurs zero or once within the <definition> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.5.8.3 <contentype>

Description: Contains the content meta-data description concerning the index for the data, access rights and time-stamps.

Multiplicity: Occurs zero or once within the <definition> element.

Attributes: None.

3.5.8.4 <definitionfield>

Description: The container for the structure definition itself.

Multiplicity: Occurs zero or more times within the <definition> element.

Attributes: Nonne.

3.5.8.5 <fieldlabel>

Description: The vocabulary used to identify the type of definition field.

Multiplicity: Occurs once within the <definitionfield> element.

Attributes: None.

3.5.8.6 <fielddata>

Description: The actual value entry for the data field.

Multiplicity: Occurs once within the <definitionfield> element.

Attributes: None.

3.5.8.7 <description>

Description: Contains the content materials that are used to describe the definition listed in the associated data.

Multiplicity: Occurs zero or once within the <definition> element.

Attributes: None.

3.5.8.8 <ext_definition>

Description: This element contains the proprietary extensions to the <definition> element.

Multiplicity: Occurs zero or once within the <definition> element.

Attributes: None.

3.5.9 <product>

Description: The materials produced by the learner as a result of undertaking the activity. These materials can consist of any electronic storable information. The material stored should be that related to the activity only.

Multiplicity: Occurs zero or many times within the <activity> element.

Attributes: None.

3.5.10 <testimonial> Elements

Description: This element is used to contain the informal and formal comments made concerning the capabilities of the learner. A testimonial would, typically, be provided by a teacher, employer or someone who has a close knowledge of the relevant capabilities of the learner.

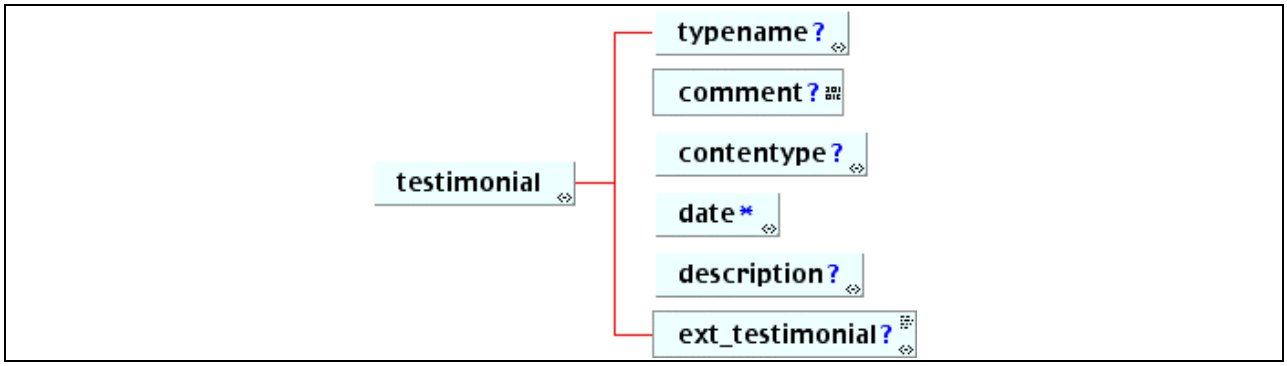

Figure 3.14 <testimonial> elements.

Multiplicity: Occurs zero or more times within the <activity> element.

Attributes: None.

Elements:

- typename
- comment
- contentype
- date
- description
- ext_testimonial

Example:

```
<testimonial>
    <typename>
        <tysource sourcetype="imsdefault"/>
        <tyvalue>Academic</tyvalue>
    </typename>
    <contentype>
        <referential>
            <indexid>testimonial_01</indexid>
        </referential>
    </contentype>
    <description>
        <full>
            <media mediamode="text" encoding="uri">student1/testimonial1.doc</media>
        </full>
    </description>
</testimonial>
```

3.5.10.1 <typename>

Description: This element presents the default vocabulary that is made available to identify the type of testimonial information. If the standard vocabulary is insufficient then an alternative entry must be used through the <tysource> element.

Multiplicity: Occurs zero or once within the <testimonial> element.

Attributes: None.

3.5.10.2 <comment>

Description: This element contains the comments that are relevant to the structure as a whole.

Multiplicity: Occurs zero or once within the <testimonial> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.5.10.3 <contentype>

Description: Contains the content meta-data description concerning the index for the data, access rights and time-stamps.

Multiplicity: Occurs zero or once within the <testimonial> element.

Attributes: None.

3.5.10.4 <date>

Description: The store for significant dates relevant to the testimonial e.g. Recorded, etc. Each testimonial will tend to have several relevant dates.

Multiplicity: Occurs once or many times within the <testimonial> element.

Attributes: None.

3.5.10.5 <description>

Description: Contains the content materials that are used to describe the testimonial listed in the associated data.

Multiplicity: Occurs zero or once within the <testimonial> element.

Attributes: None.

3.5.10.6 <ext_testimonial>

Description: This element contains the proprietary extensions to the <testimonial> element.

Multiplicity: Occurs zero or once within the <testimonial> element.

Attributes: None.

3.5.11 <evaluation> Elements

Description: This element is used to store the summary results information produced by an evaluation of the learner's activities. This evaluation could take the form of a viva, a written examination, etc. This structure is capable of supporting the summary results that would be obtained from an examination based upon the IMS QTI specification.

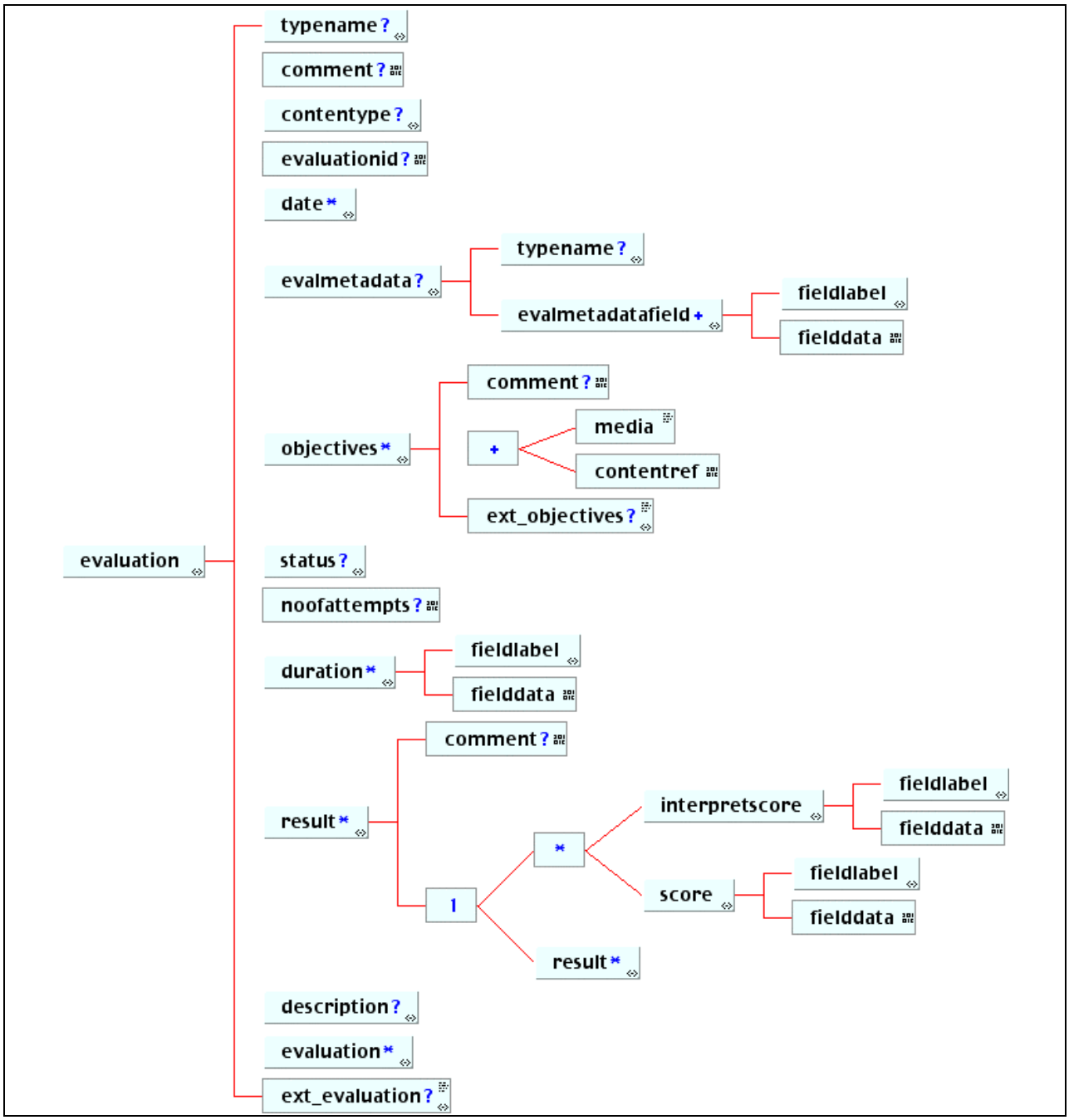

Figure 3.15 <evaluation> elements.

Multiplicity: Occurs zero or more times within the <activity> element.

Attributes: None.

Elements:

- typename
- comment
- contentype
- evaluationid
- date
- evalmetadata
- objectives
- media
- contentref
- status
- noofattempts
- duration
- result
- interpretscore
- score
- fieldtype
- fielddata
- description
- evaluation
- ext_evaluation

Example:

```
<evaluation>
    <typename>
        <tysource sourcetype="imsdefault"/>
        <tyvalue>QTI_Assessment</tyvalue>
    </typename>
    <contentype>
        <referential>
            <sourcedid>
                <source>TOEFL</source>
                <id>12345</id>
            </soucedid>
        </referential>
    </contentype>
    <evaluationid>QTI_Assessment_IDLabel</evaluationid>
    <noofattempts>3</noofattempts>
    <result>
        <interpretscore>
            <fieldlabel><typename><tyvalue>Minimum score</tyvalue></typename></fieldlabel>
            <fieldata>0</fielddata>
        </interpretscore>
        <interpretscore>
            <fieldlabel><typename><tyvalue>Maximum score</tyvalue></typename></fieldlabel>
            <fieldata>100</fielddata>
        </interpretscore>
        <score>
            <fieldlabel><typename><tyvalue>Score</tyvalue></typename></fieldlabel>
            <fieldata>30</fielddata>
        </score>
    </result>
</evaluation
```

3.5.11.1 <typename>

Description: This element presents the default vocabulary that is made available to identify the type of evaluation information. If the standard vocabulary is insufficient then an alternative entry must be used through the <tysource> element.

Multiplicity: Occurs zero or once within the <evaluation> element.

Attributes: None.

3.5.11.2 <comment>

Description: This element contains the comments that are relevant to the structure as a whole.

Multiplicity: Occurs zero or once within the <evaluation> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.5.11.3 <contentype>

Description: Contains the content meta-data description concerning the index for the data, access rights and time-stamps.

Multiplicity: Occurs zero or once within the <evaluation> element.

Attributes: None.

3.5.11.4 <evaluationid>

Description: The identifier assigned to the evaluation. In the case of IMS QTI this equates to the identifier assigned to the relevant ASI component.

Multiplicity: Occurs zero or once within the <evaluation> element.

Attributes: None.

3.5.11.5 <date>

Description: The store for significant dates relevant to the evaluation e.g. Taken, etc. Each evaluation will tend to have several relevant dates.

Multiplicity: Occurs once or many times within the <evaluation> element.

Attributes: None.

3.5.11.6 <evalmetadata>

Description: The groups of meta-data that is directly associated with the evaluation mechanism. In the case of IMS QTI ASI components this will be used to store the corresponding ASI meta-data.

Multiplicity: Occurs zero or once within the <evaluation> element.

Attributes: None.

Elements:

- typename
- evalmetadatafield

3.5.11.7 <evalmetadatafield>

Description: The meta-data that is directly associated with the evaluation mechanism. Each of these elements contains a single meta-data field.

Multiplicity: Occurs once or many times within the <evalmetadata> element.

Attributes: None.

Elements:

- fieldlabel
- fielddata

3.5.11.8 <objectives>

Description: The objectives associated with the evaluation.

Multiplicity: Occurs zero or more times within the <evaluation> element. Each view may be assigned its own set of objectives.

Attributes:

- **view (optional - list of: All, Administrator, AdminAuthority, Assessor, Author, Candidate, InvigilatorProctor, Psychometrician, Scorer, Tutor. Default = 'All').** The view defines who may see the objectives. This definition follows that described in the IMS QTI specification.
  Data-type = Enumerated list.

Elements:

- comment
- media
- contentref
- ext_objectives

3.5.11.9 <media>

Description: The actual objectives themselves. The data is stored as 'base-64' coding.

Multiplicity: Occurs zero or more times within the <objectives> element.

Attributes:

- **mediamode (required - list of: Text, Image, Video, Audio, Applet, Application).** The type of content that is stored.
  Data-type = Enumerated list.
- **mimetype (required).** The mime-type associated with the content. The RFC 1521 definitions are adopted.
  Data-type = String.

- **contentreftype (list of: uri, entityref, Base-64. Default= 'Base-64').** The mechanism used for the storage of the content. The 'uri' and 'entityref' options are used for an external filename whereas the 'Base-64' code is used for internally stored information.
  Data-type = Enumerated list.

3.5.11.10 <contentref>

Description: The external reference label for the objectives material. This external reference takes the form as described in the IMS QTI specification for the 'matref' element. The entry format is a string.

Multiplicity: Occurs zero or more times within the <objectives> element.

Attributes: None.

3.5.11.11 <status>

Description: An evaluation can have an associated status e.g. Active, Complete, etc.

Multiplicity: Occurs zero or once within the <evaluation> element.

Attributes: None.

3.5.11.12 <noofattempts>

Description: The number of attempts undertaken in completing the evaluation. The entry format is an integer.

Multiplicity: Occurs zero or once within the <evaluation> element.

Attributes: None.

3.5.11.13 <duration>

Description: Contains information that describes time-based statistics about the evaluation e.g. time taken to complete the evaluation, average time taken per attempt, etc.

Multiplicity: Occurs zero or more times within the <evaluation> element.

Attributes: None.

Elements:
- fieldlabel
- fielddata

3.5.11.14 <result>

Description: Contains the summary results concerning the evaluation itself. These results concern the actual scores and the associated context information for their interpretation.

Multiplicity: Occurs zero or more times within the <evaluation> element.

Attributes: None.

Elements:
- interpretscore
- score
- result

3.5.11.15 <interpretscore>

Description: Contains interpretative information about the scores to be recorded e.g. the maximum possible score of the exam.

Multiplicity: Occurs zero or more times within the <result> element.

Attributes: None.

Elements:
- fieldlabel
- fielddata

3.5.11.16 <score>

Description: Contains the actual values of the relevant results e.g. the score of the exam.

Multiplicity: Occurs zero or more times within the <result> element.

Attributes: None.

Elements:

- fieldlabel
- fielddata

3.5.11.17 <fieldlabel>

Description: The vocabulary used to identify the type of <duration>, <interpretscore> or <score> fields.

Multiplicity: Occurs once within the <duration>, <interpretscore> and <score> elements.

Attributes: None.

3.5.11.18 <fielddata>

Description: The actual value entry for the data field.

Multiplicity: Occurs once within the <duration>, <interpretscore> and <score> elements.

Attributes: None.

3.5.11.19 <description>

Description: Contains the content materials that are used to describe the evaluation listed in the associated data.

Multiplicity: Occurs zero or once within the <evaluation> element.

Attributes: None.

3.5.11.20 <evaluation>

Description: This recursive structure allows complex summary results information to be stored. An evaluation may itself be defined in terms of the sub-evaluations.

Multiplicity: Occurs zero or more times within the <evaluation> element.

Attributes: None.

3.5.11.21 <ext_evaluation>

Description: This element contains the proprietary extensions to the <evaluation> element.

Multiplicity: Occurs zero or once within the <evaluation> element.

Attributes: None.

3.5.12 <description>

Description: Contains the content materials that are used to describe the activity listed in the associated data.

Multiplicity: Occurs zero or once within the <activity> element.

Attributes: None.

3.5.13 <ext_activity>

Description: This element contains the proprietary extensions to the <activity> element.

Multiplicity: Occurs zero or once within the <activity> element.

Attributes: None.

3.6 <competency> Elements

Description. The *competency* learner information consists of the descriptions of the skills the learner has acquired. These skills may be associated with some formal or informal training or work history (described in the 'activity') and formal awards (described in the 'qcl'). The corresponding level of competency may also be defined. A different 'competency' structure will be used for each competency.

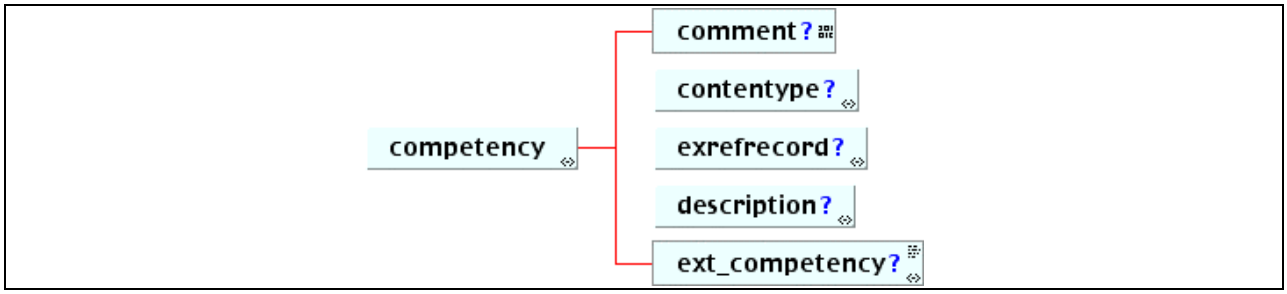

Figure 3.16 <competency> elements.

Multiplicity: Occurs zero or more times within the <learnerinformation> element.

Attributes. None.

Elements:

- comment
- contentype
- exrefrecord
- description
- ext_competency

Example:

```
<competency>
    <contentype>
        <referential>
            <indexid>competency_01</indexid>
        </referential>
    </contentype>
    <exrefrecord>
        <date>
            <typename>
                <tysource sourcetype="imsdefault"/>
                <tyvalue>Awarded</tyvalue>
            </typename>
            <datetime>1999:10:31</datetime>
        </date>
        <recformat uri="formats/pcsupport.doc"/>
        <recdata uri="studentname/competency.doc"/>
    </exrefrecord>
    <description>
        <short>Level 1 Hardware Support for PCs<short>
    </description>
</competency>
```

3.6.1 <comment>

Description: This element contains the comments that are relevant to the structure as a whole.

Multiplicity: Occurs zero or once within the <competency> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.6.2 <contentype>

Description: Contains the content meta-data description concerning the index for the data, access rights and time-stamps.

Multiplicity: Occurs zero or once within the <competency> element.

Attributes: None.

3.6.3 <exrefrecord>

Description: The actual competency information is contained within this element. Either a reference to an external file is used or the content is supplied directly in a format appropriate to the competency description itself.

Multiplicity: Occurs zero or once within the <competency> element.

Attributes: None.

3.6.4 <description>

Description: Contains the content materials that are used to describe the competencies listed in the associated data.

Multiplicity: Occurs zero or once within the <competency> element.

Attributes: None.

3.6.5 <ext_competency>

Description: This element contains the proprietary extensions to the <competency> element.

Multiplicity: Occurs zero or once within the <competency> element.

Attributes: None.

3.7 <transcript> Elements

Description. The *transcript* learner information is used to store the summary records of the academic performance at an institution. This information may contain an arbitrary level of detail and so there is no proscribed structure for a transcript. A separate entry is used for each transcript record.

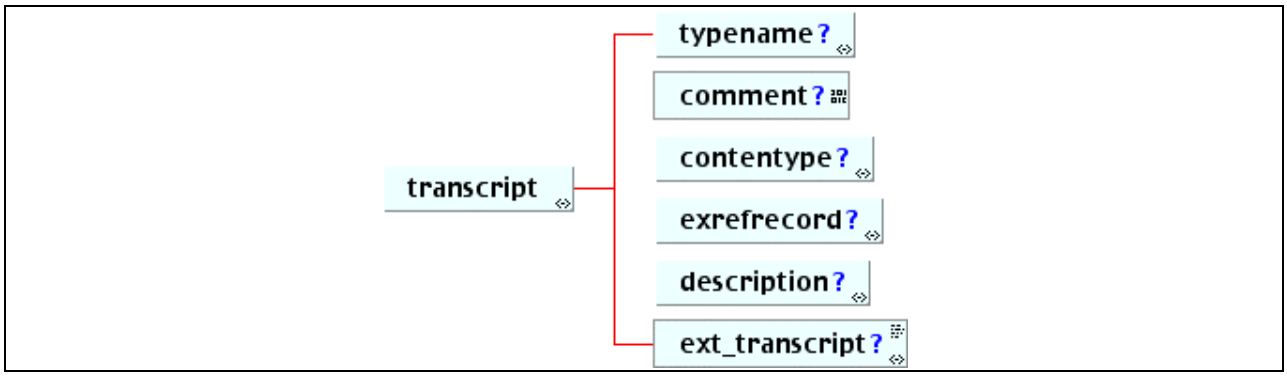

Figure 3.17 <transcript> elements.

Multiplicity: Occurs zero or more times within the <learnerinformation> element.

Attributes: None.

Elements:

- typename
- comment
- contentype
- exrefrecord
- description
- ext_transcript

Example:

```
<transcript>
    <contentype>
        <referential>
            <indexid>transcript_01</indexid>
        </referential>
    </contentype>
    <exrefrecord>
        <date>
            <typename>
                <tysource sourcetype="imsdefault"/>
                <tyvalue>Awarded</tyvalue>
            </typename>
            <datetime>2000:02:18</datetime>
        </date>
        <recformat uri="transformats/schools.doc"/>
        <recdata uri="student234/hstranscript.doc"/>
    </exrefrecord>
    <description>
        <short>External reference to a High-school transcript.</short>
    </description>
</transcript>
```

3.7.1 <typename>

Description: This element presents the default vocabulary that is made available to identify the type of transcript information. If the standard vocabulary is insufficient then an alternative entry must be used through the <tysource> element.

Multiplicity: Occurs zero or once within the <transcript> element.

Attributes: None.

3.7.2 <comment>

Description: This element contains the comments that are relevant to the structure as a whole.

Multiplicity: Occurs zero or once within the <transcript> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.7.3 <contentype>

Description: Contains the content meta-data description concerning the index for the data, access rights and time-stamps.

Multiplicity: Occurs zero or once within the <transcript> element.

Attributes: None.

3.7.4 <exrefrecord>

Description: The actual transcript information is contained within this element. Either a reference to an external file is used or the content is supplied directly in a format appropriate to the transcript description itself.

Multiplicity: Occurs zero or once within the <transcript> element.

Attributes: None.

3.7.5 <description>

Description: Contains the content materials that are used to describe the transcript listed in the associated data.

Multiplicity: Occurs zero or once within the <transcript> element.

Attributes: None.

3.7.6 <ext_transcript>

Description: This element contains the proprietary extensions to the <transcript> element.

Multiplicity: Occurs zero or once within the <transcript> element.

Attributes: None.

3.8 <accessibility> Elements

Description. The *accessibility* learner information consists of the cognitive, technical and physical preferences for the learner, disability, eligibility and language capabilities. These describe the learner's capabilities to interact with the learning environment.

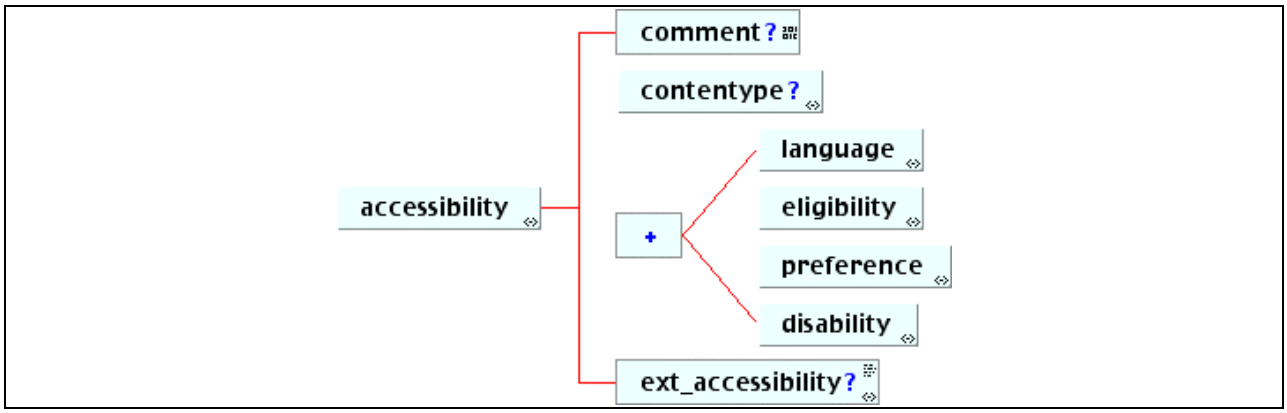

Figure 3.18 <accessibility> elements.

Multiplicity: Occurs zero or more times within the <learnerinformation> element.

Attributes: None.

Elements:

- comment
- contentype
- language
- preference
- eligibility
- disability
- ext_accessibility

3.8.1 <comment>

Description: This element contains the comments that are relevant to the structure as a whole.

Multiplicity: Occurs zero or once within the <accessibility> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.8.2 <contentype>

Description: Contains the content meta-data description concerning the index for the data, access rights and time-stamp.

Multiplicity: Occurs zero or once within the <accessibility> element.

Attributes: None.

3.8.3 <language> Elements

Description. Contains the information that describes the language proficiencies of the learner. The language proficiencies refer to the oral, written and reading abilities of the learner.

Multiplicity: Occurs zero or more times within the <accessibility> element.

Attributes: None.

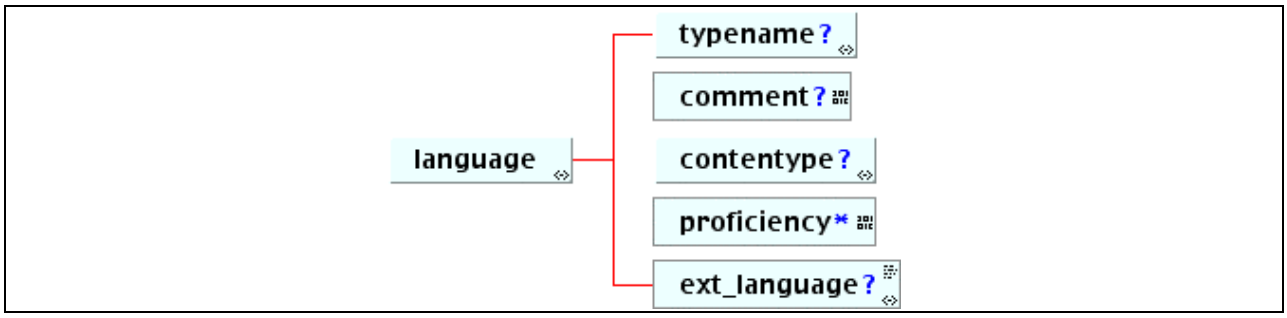

Figure 3.19 <language> elements.

Elements:

- typename
- comment
- contentype
- proficiency
- ext_language

Example:

```
<language>
    <typename>
        <tysource sourcetype="imsdefault"/>
        <tyvalue>French</tyvalue>
    </typename>
    <contentype>
        <referential>
            <indexid>language_01</indexid>
        </referential>
    </contentype>
    <proficiency profcode="OralSpeak">Excellent</proficiency>
    <proficiency profcode="OralComp">Excellent</proficiency>
    <proficiency profcode="Read">Good</proficiency>
    <proficiency profcode="Write">Poor</proficiency>
</language>
```

3.8.3.1 <typename>

Description: This element presents the default vocabulary that is made available to identify the type of language information. If the standard vocabulary is insufficient then an alternative entry must be used through the <tysource> element.

Multiplicity: Occurs zero or once within the <testimonial> element.

Attributes: None.

3.8.3.2 <comment>

Description: This element contains the comments that are relevant to the structure as a whole.

Multiplicity: Occurs zero or once within the <language> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.8.3.3 <contentype>

Description: Contains the content meta-data description concerning the index for the data, access rights and time-stamps.

Multiplicity: Occurs zero or once within the <language> element.

Attributes: None.

3.8.3.4 <proficiency>

Description: Contains the description of the oral, writing and reading proficiencies for a particular language. Each proficiency entry can be used to describe all the capabilities for one particular language. Different languages should be submitted under separate <language> entries.

Multiplicity: Occurs zero or many times within the <language> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.
- **profmode (required selection from the enumerated list of: OralSpeak, OralComp, Read, Write).** Identifies the type of proficiency being described. The description itself takes the form of a string. Data-type = Enumerated list.

3.8.3.5 <ext_language>

Description: This element contains the proprietary extensions to the <language> element.

Multiplicity: Occurs zero or once within the <language> element.

Attributes: None.

3.8.4 <preference> Elements

Description: In many situations learners have a set of preferences for how they interact with a learning system. These preferences can be used to describe the physical environment required, the input/output technology required and also the learning styles that best suit the individual.

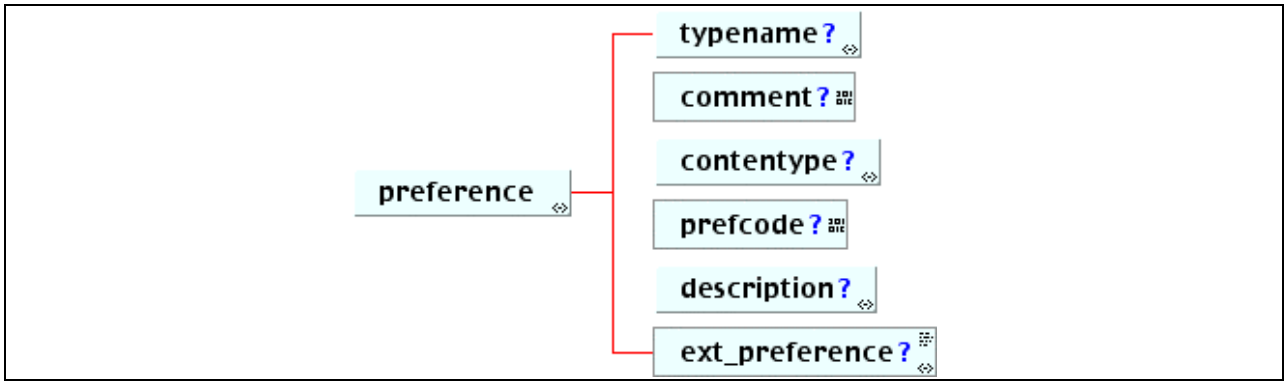

Figure 3.20 <preference> elements.

Multiplicity: Occurs zero or more times within the <accessibility> element.

Attributes: None.

Elements:

- typename
- comment
- contentype
- prefcode
- description
- ext_preference

Example:

```
<preference>
    <typename>
        <tysource sourcetype="imsdefault"/>
        <tyvalue>Physical</tyvalue>
    </typename>
    <contentype>
        <referential>
            <indexid>preference_01</indexid>
```

```
        </referential>
    </contentype>
    <prefcode>Learning centre access</prefcode>
</preference>
```

3.8.4.1 <typename>

Description: This element presents the default vocabulary that is made available to identify the type of preference information. If the standard vocabulary is insufficient then an alternative entry must be used through the <tysource> element.

Multiplicity: Occurs zero or once within the <testimonial> element.

Attributes: None.

3.8.4.2 <comment>

Description: This element contains the comments that are relevant to the structure as a whole.

Multiplicity: Occurs zero or once within the <preference> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.8.4.3 <contentype>

Description: Contains the content meta-data description concerning the index for the data, access rights and time-stamps.

Multiplicity: Occurs zero or once within the <preference> element.

Attributes: None.

3.8.4.4 <prefcode>

Description: The description of the preference itself. This could take the form of an agreed coding mechanism or a simple text based description. The entry format is as a string.

Multiplicity: Occurs zero or once within the <preference> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.8.4.5 <description>

Description: Contains the content materials that are used to describe the preferences listed in the associated data.

Multiplicity: Occurs zero or once within the <preference> element.

Attributes: None.

3.8.4.6 <ext_preference>

Description: This element contains the proprietary extensions to the <preference> element.

Multiplicity: Occurs zero or once within the <preference> element.

Attributes: None.

3.8.5 <eligibility> Elements

Description: There may be many criteria that must be applied to the learner to determine their eligibility for types of support, activity, etc. Typical areas of eligibility are financial support and study prerequisites. At present this data structure is incomplete and will be developed in further releases of the LIP specification.

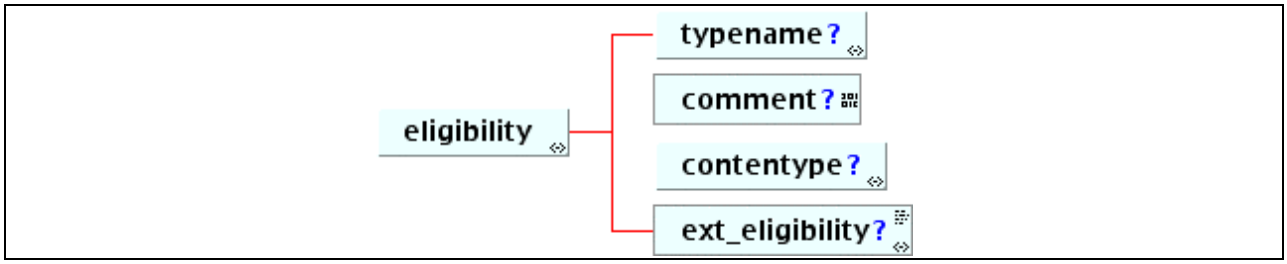

Figure 3.21 <eligibility> elements.

Multiplicity: Occurs zero or more times within the <accessibility> element.

Attributes: None.

Elements:

- typename
- comment
- contentype
- ext_eligibility

Note **This element is for further study in later releases of this specification.**

3.8.5.1 <typename>

Description: This element presents the default vocabulary that is made available to identify the type of eligibility information. If the standard vocabulary is insufficient then an alternative entry must be used through the <tysource> element.

Multiplicity: Occurs zero or once within the <testimonial> element.

Attributes: None.

3.8.5.2 <comment>

Description: This element contains the comments that are relevant to the structure as a whole.

Multiplicity: Occurs zero or once within the <eligibility> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.8.5.3 <contentype>

Description: Contains the content meta-data description concerning the index for the data, access rights and time-stamps.

Multiplicity: Occurs zero or once within the <eligibility> element.

Attributes: None.

3.8.5.4 <ext_eligibility>

Description: This element contains the proprietary extensions to the <eligibility> element.

Multiplicity: Occurs zero or once within the <eligibility> element.

Attributes: None.

3.8.6 <disability> Elements

Description: The disabilities suffered by the individual should be recorded if these will have an effect on the learner's ability to learn e.g. poor eyesight may require the usage of larger fonts. At present this data structure is incomplete and will be developed in further releases of the LIP specification.

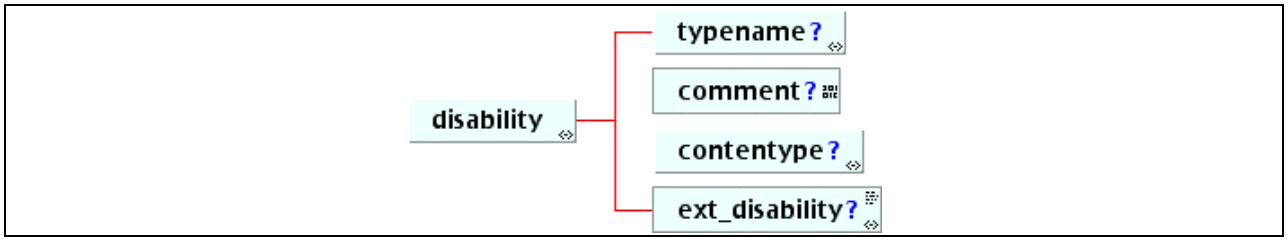

Figure 3.22 <disability> elements.

Multiplicity: Occurs zero or more times within the <accessibility> element.

Attributes: None.

Elements:

- typename
- comment
- contentype
- ext_disability

Note: This element is for further study in later releases of this specification.

3.8.6.1 <typename>

Description: This element presents the default vocabulary that is made available to identify the type of disability information. If the standard vocabulary is insufficient then an alternative entry must be used through the <tysource> element.

Multiplicity: Occurs zero or once within the <testimonial> element.

Attributes: None.

3.8.6.2 <comment>

Description: This element contains the comments that are relevant to the structure as a whole.

Multiplicity: Occurs zero or once within the <disability> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.8.6.3 <contentype>

Description: Contains the content meta-data description concerning the index for the data, access rights and time-stamps.

Multiplicity: Occurs zero or once within the <disability> element.

Attributes: None.

3.8.6.4 <ext_disability>

Description: This element contains the proprietary extensions to the <disability> element.

Multiplicity: Occurs zero or once within the <disability> element.

Attributes: None.

3.8.7 <ext_accessibility>

Description: This element contains the proprietary extensions to the <accessibility> element.

Multiplicity: Occurs zero or once within the <accessibility> element.

Attributes: None.

3.9 <interest > Elements

Description: The *interest* learner information consists of descriptions of the hobbies and other recreation activities. These interests may have formal awards (as described in the associated 'qcl'). Electronic versions of the products of these interests may also be contained. Each interest will be described within its own structure.

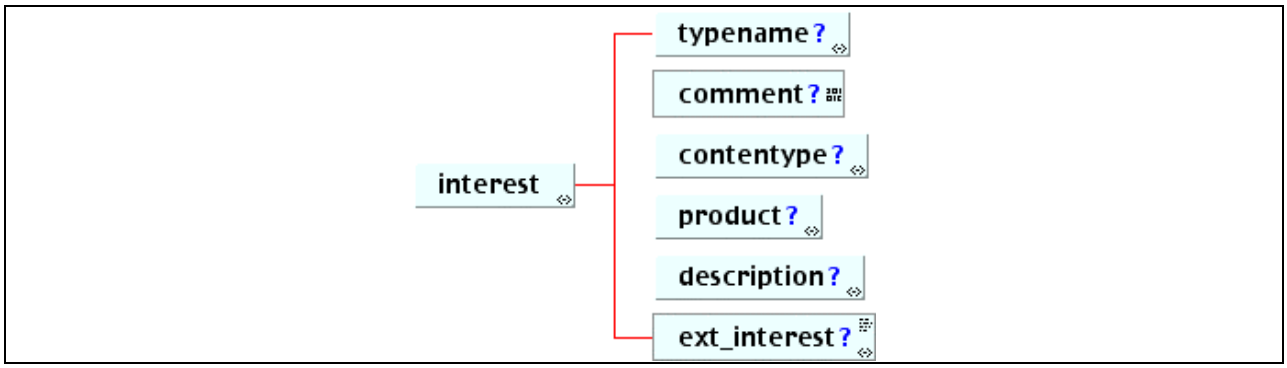

Figure 3.23 <interest> elements.

Multiplicity: Occurs zero or more times within the <learnerinformation> element.

Attributes: None.

Elements:

- typename
- comment
- contentype
- product
- description
- ext_interest

Example:

```
<interest>
    <typename>
        <tysource sourcetype="imsdefault"/>
        <tyvalue>Recreational</tyvalue>
    </typename>
    <contentype>
        <referential>
            <indexid>interest_01</indexid>
        </referential>
    </contentype>
    <product>
        <typename>
            <tysource sourcetype="imsdefault"/>
            <tyvalue>Portfolio</tyvalue>
        </typename>
        <contentype>
            <referential>
                <indexid>product_01</indexid>
            </referential>
        </contentype>
        <description>
            <full>
                <media mediamode="Image" encoding="uri">personal/picture.gif</media>
            <full>
        </description>
    </product>
    <description>
        Short>An amateur water-colour artist<short>
    </description>
</interest>
```

3.9.1 <typename>

Description: This element presents the default vocabulary that is made available to identify the type of interest information. If the standard vocabulary is insufficient then an alternative entry must be used through the <tysource> element.

Multiplicity: Occurs zero or once within the <interest> element.

Attributes: None.

3.9.2 <comment>

Description: This element contains the comments that are relevant to the structure as a whole.

Multiplicity: Occurs zero or once within the <interest> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.9.3 <contentype>

Description: Contains the content meta-data description concerning the index for the data, access rights and time-stamps.

Multiplicity: Occurs zero or once within the <interest> element.

Attributes: None.

3.9.4 <product>

Description: The materials that have been created by the learner and which constitute a part of the interest itself e.g. this could include a picture of the garden from a gardener.

Multiplicity: Occurs zero or once within the <interest> element.

Attributes: None.

3.9.5 <description>

Description: Contains the content materials that are used to describe the interests presented in the associated data.

Multiplicity: Occurs zero or once within the <interest> element.

Attributes: None.

3.9.6 <ext_interest>

Description: This element contains the proprietary extensions to the <interest> element.

Multiplicity: Occurs zero or once within the <interest> element.

Attributes: None.

3.10 <affiliation> Elements

Description: The *affiliation* learner information is used to store the descriptions of the organisation affiliations associated with the learner. These affiliations are intended to consist of those of a professional, personal, military or civic nature. Membership of groups and activities within the work environment should be supported using the IMS Enterprise specification.

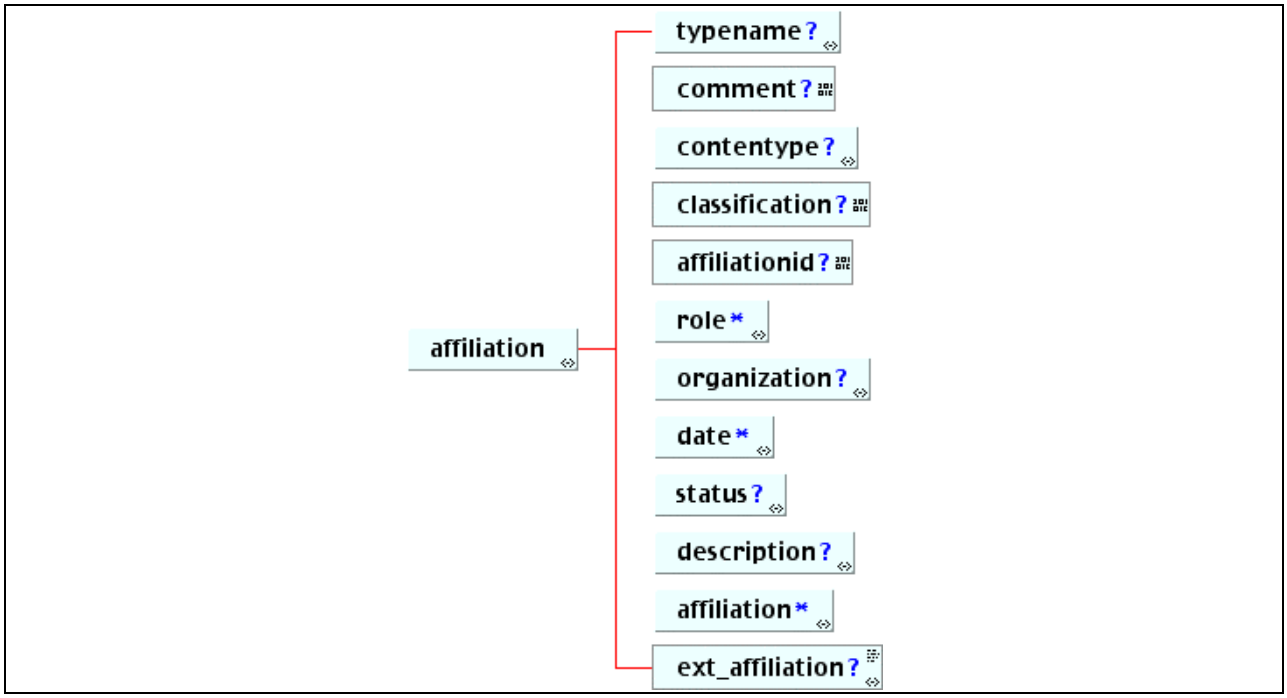

Figure 3.24 <affiliation> elements.

Multiplicity: Occurs zero or more times within the <learnerinformation> element.

Attributes: None.

Elements:

- typename
- comment
- contentype
- classification
- affiliationid
- role
- organization
- date
- status
- description
- affiliation
- ext_affiliation

Example:

```
<affiliation>
    <typename>
        <tysource sourcetype="imsdefault"/>
        <tyvalue>Professional</tyvalue>
    </typename>
    <contentype>
        <referential>
            <indexid>affiliation_01</indexid>
        </referential>
    </contentype>
    <affiliationid>2457923A</affiliationid>
    <organization>
        <typename>
            <tysource sourcetype="imsdefault"/>
            <tyvalue>Professional</tyvalue>
        </typename>
        <description>
            <short>Institute of Electronic & Electrical Engineers</short>
```

```
        </description>
    </organization>
    <date>
    <typename>
        <tysource sourcetype="imsdefault"/>
        <tyvalue>Join</tyvalue>
    </typename>
        <datetime>1998</datetime>
    </date>
    <status>
    <typename>
        <tysource sourcetype="imsdefault"/>
        <tyvalue>Active</tyvalue>
    </typename>
    </status>
    <description>
        <short>All fees paid</short>
    </description>
</affiliation>
```

3.10.1 <typename>

Description: This element presents the default vocabulary that is made available to identify the type of affiliation information. If the standard vocabulary is insufficient then an alternative entry must be used through the <tysource> element.

Multiplicity: Occurs zero or once within the <affiliation> element.

Attributes: None.

3.10.2 <comment>

Description: This element contains the comments that are relevant to the structure as a whole.

Multiplicity: Occurs zero or once within the <affiliation> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.10.3 <contentype>

Description: Contains the content meta-data description concerning the index for the data, access rights and time-stamps.

Multiplicity: Occurs zero or once within the <affiliation> element.

Attributes: None.

3.10.4 <classification>

Description: Contains the class of the affiliation e.g. executive, honorary, etc.

Multiplicity: Occurs zero or once within the <affiliation> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.10.5 <affiliationid>

Description: This is used to store the identification number of the affiliation e.g. the membership number assigned to the learner for that particular organisation. This number would normally be assigned by the organisation itself. Entry format is a string.

Multiplicity: Occurs zero or once within the <affiliation> element.

Attributes: None.

3.10.6 <role> Elements

Description: A learner will have roles in the organisations to which they are affiliated. These roles will change over time and together they form an important part of a resume.

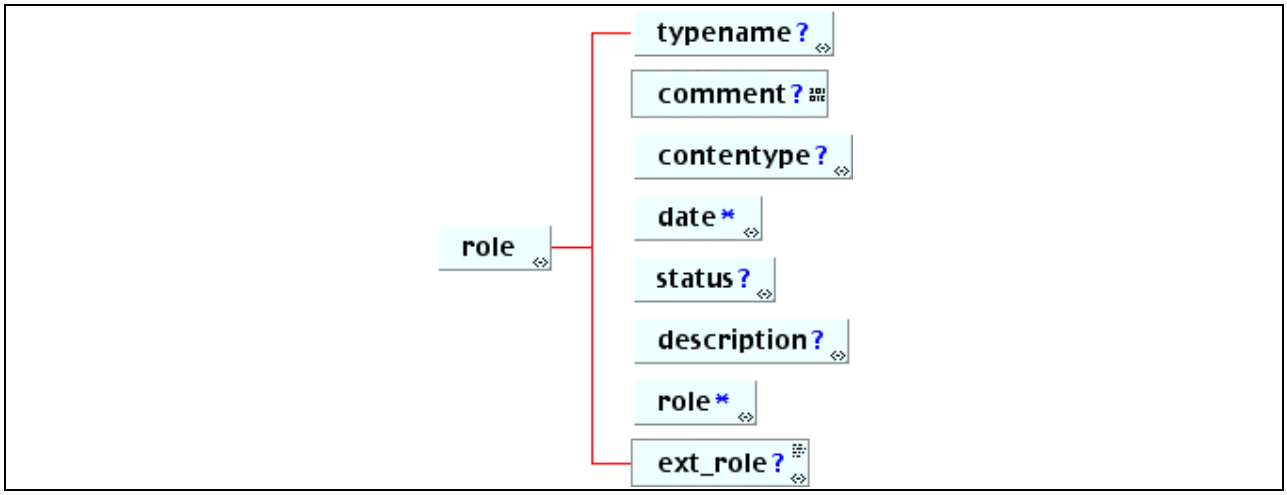

Figure 3.25 <role> elements.

Multiplicity: Occurs once or many times within the <affiliation> element.

Attributes: None.

Elements:

- typename
- comment
- contentype
- date
- status
- description
- role
- ext_role

Example:

```
<role>
    <typename>
        <tysource sourcetype="imsdefault"/>
        <tyvalue>Officer</tyvalue>
    </typename>
    <contentype>
        <referential>
            <indexid>affiliation_role_01</indexid>
        </referential>
    </contentype>
    <date>
        <typename>
            <tysource sourcetype="imsdefault"/>
            <tyvalue>Start</tyvalue>
        </typename>
    <datetime>2000:04:01</datetime>
    </date>
    <date>
        <typename>
            <tysource sourcetype="imsdefault"/>
            <tyvalue>Finish</tyvalue>
        </typename>
        <datetime>2001:03:31</datetime>
    </date>
    <description>
        <short>Region 8</short>
    </description>
</role>
```

3.10.6.1 <typename>

Description: This element presents the default vocabulary that is made available to identify the type of role information. If the standard vocabulary is insufficient then an alternative entry must be used through the <tysource> element.

Multiplicity: Occurs zero or once within the <role> element.

Attributes: None.

3.10.6.2 <comment>

Description: This element contains the comments that are relevant to the structure as a whole.

Multiplicity: Occurs zero or once within the <role> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.10.6.3 <contentype>

Description: Contains the content meta-data description concerning the index for the data, access rights and time-stamps.

Multiplicity: Occurs zero or once within the <role> element.

Attributes: None.

3.10.6.4 <date>

Description: The store for significant dates relevant to the role e.g. start, finish, etc. Each role will tend to have several relevant dates.

Multiplicity: Occurs once or many times within the <affiliation> element.

Attributes: None.

3.10.6.5 <status>

Description: A role will have an associated status e.g. Active, Pending, Retired, etc.

Multiplicity: Occurs zero or once within the <role> element.

Attributes: None.

3.10.6.6 <description>

Description: Contains the content materials that are used to describe the role listed in the associated data.

Multiplicity: Occurs zero or once within the <role> element.

Attributes: None.

3.10.6.7 <role>

Description: The role within an organisation could consist of one or more sub-roles. These sub-roles can themselves have sub-roles and so any complex hierarchy can be supported.

Multiplicity: Occurs zero or many times within the <role> element.

Attributes: None.

3.10.6.8 <ext_role>

Description: This element contains the proprietary extensions to the <role> element.

Multiplicity: Occurs zero or once within the <role> element.

Attributes: None.

3.10.7 <organization>

Description: This is the name of the organisation to which the learner is affiliated. If the user is affiliated to more than one organisation then this must be entered in different affiliations.

Multiplicity: Occurs zero or once within the <affiliation> element.

Attributes: None.

3.10.8 <date>

Description: The store for significant dates relevant to the affiliation e.g. joining date, date of expiry, etc. Each affiliation will tend to have several relevant dates.

Multiplicity: Occurs once or many times within the <affiliation> element.

Attributes: None.

3.10.9 <status>

Description: An affiliation can have an associated status e.g. Active, Pending, Retired, etc.

Multiplicity: Occurs zero or once within the <affiliation> element.

Attributes: None.

3.10.10 <description>

Description: Contains the content materials that are used to describe the affiliation listed in the associated data.

Multiplicity: Occurs zero or once within the <affiliation> element.

Attributes: None.

3.10.11 <affiliation>

Description: This structure allows an affiliation to have sub-affiliations and in turn those affiliations can have sub-affiliations. This allows the construction of hierarchically related affiliations.

Multiplicity: Occurs once or many times within the <affiliation> element.

Attributes: None.

3.10.12 <ext_affiliation>

Description: This element contains the proprietary extensions to the <affiliation> element.

Multiplicity: Occurs zero or once within the <affiliation> element.

Attributes: None.

3.11 <securitykey> Elements

Description. The *securitykey* learner information is used to store the passwords and security codes that are to be used when communicating with the learner or are authorised/validated by the learner. A different 'securitykey' structure will be used for each key and class of key.

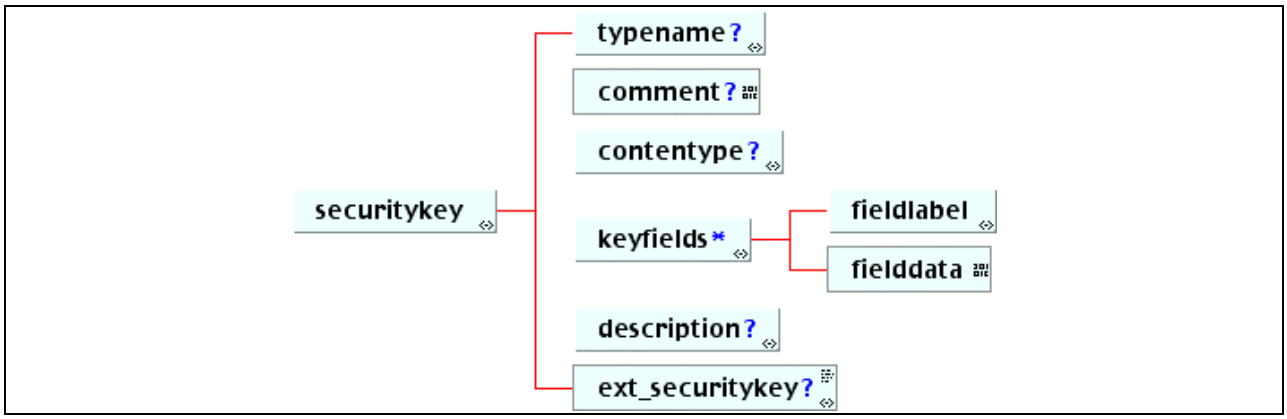

Figure 3.26 <securitykey> elements.

Multiplicity. Occurs zero or more times within the <learnerinformation> element.

Attributes. None.

Elements

- typename
- comment
- contentype
- keyfields
- description
- ext_securitykey

Example:

```
<securitykey>
    <typename>
        <tysource sourcetype="imsdefault"/>
        <tyvalue>Password</tyvalue>
    </typename>
    <contentype>
        <referential>
            <indexid>securitykey_01</indexid>
        </referential>
    </contentype>
    <keyfields>
        <fieldlabel>
            <typename><tyvalue>userlmspassword</tyvalue></typename>
        </fieldlabel>
        <fielddata>nitwoodmgsbtsoy<fielddata>
    </keyfields>
    <description>
        <short>User access password to the LMS</short>
    </description>
</securitykey>
```

3.11.1 <typename>

Description: This element presents the default vocabulary that is made available to identify the type of securitykey information. If the standard vocabulary is insufficient then an alternative entry must be used through the <tysource> element.

Multiplicity: Occurs zero or once within the <securitykey> element.

Attributes: None.

3.11.2 <comment>

Description: This element contains the comments that are relevant to the structure as a whole.

Multiplicity: Occurs zero or once within the <securitykey> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.11.3 <contentype>

Description: Contains the content meta-data description concerning the index for the data, access rights and time-stamps.

Multiplicity: Occurs zero or once within the <transcript> element.

Attributes: None.

3.11.4 <keyfields>

Description: Each security key is contained as a tuple. This tuple defines the type of security key and the actual key itself. Each security key is contained within its own tuple but an arbitrary number of keys can be contained within the overall <securitykey> structure.

Multiplicity: Occurs zero or more times within the <securitykey> element.

Attributes: None.

Elements:

- fieldlabel
- fielddata

3.11.4.1 <fieldlabel>

Description: The vocabulary used to identify the type of key.

Multiplicity: Occurs once within the <keyfields> element.

Attributes: None.

3.11.4.2 <fielddata>

Description: The actual value entry for the data field.

Multiplicity: Occurs once within the <keyfields> element.

Attributes: None.

3.11.5 <description>

Description: Contains the content materials that are used to describe the security keys listed in the associated data.

Multiplicity: Occurs zero or once within the <securitykey> element.

Attributes: None.

3.11.6 <ext_securitykey>

Description: This element contains the proprietary extensions to the <securitykey> element.

Multiplicity: Occurs zero or once within the <securitykey> element.

Attributes: None.

3.12 <relationship> Elements

Description. The *relationship* learner information is used to store the description of the relations between the other core data structures. All of the relationship information has been removed from the other structures to enable these to be collected at a single place.

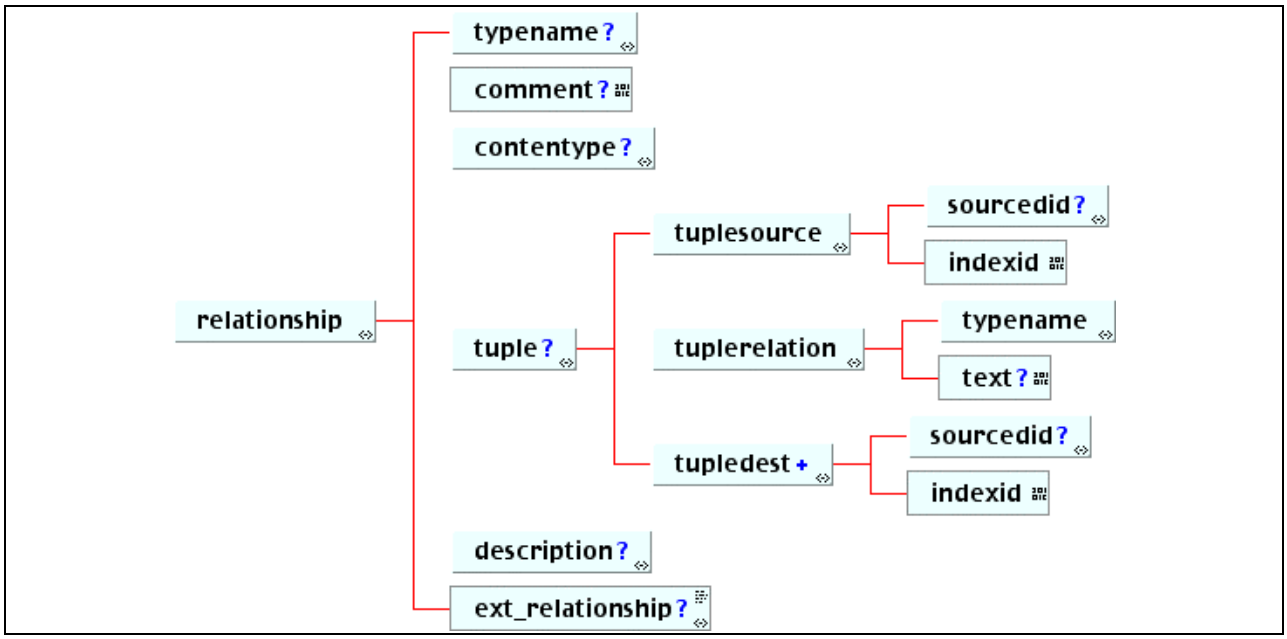

Figure 3.27 <relationship> elements.

Multiplicity. Occurs zero or more times within the <learnerinformation> element.

Attributes. None.

Elements:

- typename
- comment
- contentype
- tuple
- description
- ext_relationship

Example:

```
<relationship>
    <contentype>
        <referential>
            <indexid>relationship_01</indexid>
        </referential>
    </contentype>
    <tuple>
        <tuplesource>
            </sourcedid>
                <source>IMS_LIP_V1p0_Example</source>
                <id>1001</id>
            </sourcedid>
            <indexid>qcl_01</indexid>
        </tuplesource>
        <tuplerelation>
            <text>results_from</text>
        </tuplerelation>
        <tupledestination>
            </sourcedid>
                <source>IMS_LIP_V1p0_Example</source>
                <id>1001</id>
            </sourcedid>
            <indexid>transcript_01</indexid>
```

```
        </tupledestination>
    </tuple>
    <description>
        <short>The detailed transcript for an awarded qualification</short>
    </description>
</relationship>
```

3.12.1 <typename>

Description: This element presents the default vocabulary that is made available to identify the type of relationship information. If the standard vocabulary is insufficient then an alternative entry must be used through the <tysource> element.

Multiplicity: Occurs zero or once within the <relationship> element.

Attributes: None.

3.12.2 <comment>

Description: This element contains the comments that are relevant to the structure as a whole.

Multiplicity: Occurs zero or once within the <relationship> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.12.3 <contentype>

Description: Contains the content meta-data description concerning the index for the data, access rights and time-stamps.

Multiplicity: Occurs zero or once within the <relationship> element.

Attributes: None.

3.12.4 <tuple> Elements

Description: Contains the content materials that are used to describe the relationships listed in the associated data. The relationship is defined as a one to many relationship i.e. one source to many destinations using one relationship definition.

Multiplicity: Occurs zero or once within the <relationship> element.

Attributes: None.

Elements:

- tuplesource
- tupledest
- tuplerelation
- sourcedid
- indexid
- vocab
- text

3.12.4.1 <tuplesource>

Description: The source component of the relationship. There is only one source for the one or more destination components. The source is defined either by its <indexid> or by the combination of its <sourcedid> and <indexid>.

Multiplicity: Occurs once within the <tuple> element.

Attributes: None.

3.12.4.2 <tupledest>

Description: The destination component of the relationship. There may be several destination components for each source. The destination is defined either by its <indexid> or by the combination of its <sourcedid> and <indexid>.

Multiplicity: Occurs once or more times within the <tuple> element.

Attributes: None.

3.12.4.3 <tuplerelation>

Description: The relationship that is to be defined between the source and destination identifiers. The relationship is selected from a particular vocabulary.

Multiplicity: Occurs once within the <tuple> element.

Attributes: None.

3.12.4.4 <sourcedid>

Description: The <sourcedid> is a globally unique identifier assigned to the learner or the appropriate data object. The manner in which this identifier is generated is beyond the scope of this specification.

Multiplicity: Occurs zero or once within the <tuplesource> and <tupledest> elements.

Attributes: None.

3.12.4.5 <indexid>

Description: The <indexid> is a unique identifier for the data object. The identifier is unique with respect to the associated <sourcedid> allocated to the learner. This <indexid> is persistent in that all references to this same data object must use the same <indexid>.

Multiplicity: Occurs once within the <tuplesource> and <tupledest> elements.

Attributes: None.

3.12.4.6 <typename>

Description: The mechanism by which the available tuplerelation type vocabulary is presented. This vocabulary is supplied through either an external file reference or by explicitly giving the required type.

Multiplicity: Occurs zero or once within the <tuplerelation> element.

Attributes: None.

3.12.4.7 <text>

Description: This is the text containing the definition of the relationship itself if a suitable form is not found in the <vocab> supplied vocabulary. The entry is contained as a 'string'.

Multiplicity: Occurs zero or once within the <tuplerelation> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.12.5 <description>

Description: Contains the content materials that are used to describe the relationships listed in the associated data.

Multiplicity: Occurs zero or once within the <relationship> element.

Attributes: None.

3.12.6 <ext_relationship>

Description: This element contains the proprietary extensions to the <relationship> element.

Multiplicity: Occurs zero or once within the <relationship> element.

Attributes: None.

3.13 Common Data Elements

The common elements that are defined in this sub-section are:

- comment – comments that are parsed through the XML parser;
- contentype – the meta-data for each data object;
- description – the content material associated with a data object;
- date – key dates to be assigned to the data objects;
- priority – priority of actions associated with the data object;
- status – to define the status of the data object e.g. active, complete, etc;
- product – to store the materials created e.g. a photo, text document, etc;
- typename – the vocabulary extension mechanism for alternatives to the supplied base vocabularies;
- fieldtype – the mechanism for generic definition of field types within data objects;
- fielddata – the data storage for the object field identified by the associated <fieldtype>;
- media – storage for different types of content e.g. audio, video, etc;
- text – storage for a text string;
- organization – a brief reference description of an organisation;
- exrefrecord – external record reference mechanism for formatting and data content access;
- sourcedid – the globally unique identifier used to define the learner or other data object;
- indexid – the data object identifier that is unique with respect to the <sourcedid>.

3.13.1 <comment> Elements

Description: This element contains the comments that are relevant to the structure as a whole.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

Elements: None.

Example:

```
<comment>A comment concerning the data object being defined</comment>
```

3.13.2 <contentype> Elements

Description: The container for the control information that is used to describe the learner information. This information consists of: referential, temporal and privacy information and is applied to each of the 'atomic' parts of the learner information structure.

Attributes: None.

Elements:

- comment
- referential
- temporal
- privacy
- ext_contentype

Example:

```
<contentype>
    <referential>
        <indexid>indexnumber_01</indexid>
    </referential>
    <temporal>
        <typename>
            <tysource sourcetype="imsdefault"/>
            <tyvalue>Creation</tyvalue>
        </typename>
        <temporalfield>
            <fieldlabel><typename><tyvalue>CreateDateTime</tyvalue></typename>
```

```
            </fieldlabel>
            <fielddata>2000:11:06T09:00:00</fielddata>
        </temporalfield>
    </temporal>
    <temporal>
        <typename>
            <tysource sourcetype="imsdefault"/>
            <tyvalue>Expiry</tyvalue>
        </typename>
        <temporalfield>
            <fieldlabel><typename><tyvalue>ExpireDateTime</tyvalue></typename>
            </fieldlabel>
            <fielddata>2001:10:31T08:59:59</fielddata>
        </temporalfield>
    </temporal>
    <privacy>
        <typename>
            <tysource sourcetype="imsdefault"/>
            <tyvalue>Owner</tyvalue>
        </typename>
        <privacyfield>
            <fieldlabel><typename><tyvalue>Access Rights</tyvalue></typename>
            </fieldlabel>
            <fielddata>Create, Read, Update, Write</fielddata>
        </privacyfield>
    </privacy>
    <privacy>
        <typename>
            <tysource sourcetype="imsdefault"/>
            <tyvalue>Steward</tyvalue>
        </typename>
        <privacyfield>
            <fieldlabel><typename><tyvalue>Access Rights</tyvalue></typename>
            </fieldlabel>
            <fielddata>Read, Write, Delete</fielddata>
        </privacyfield>
    </privacy>
</contentype
```

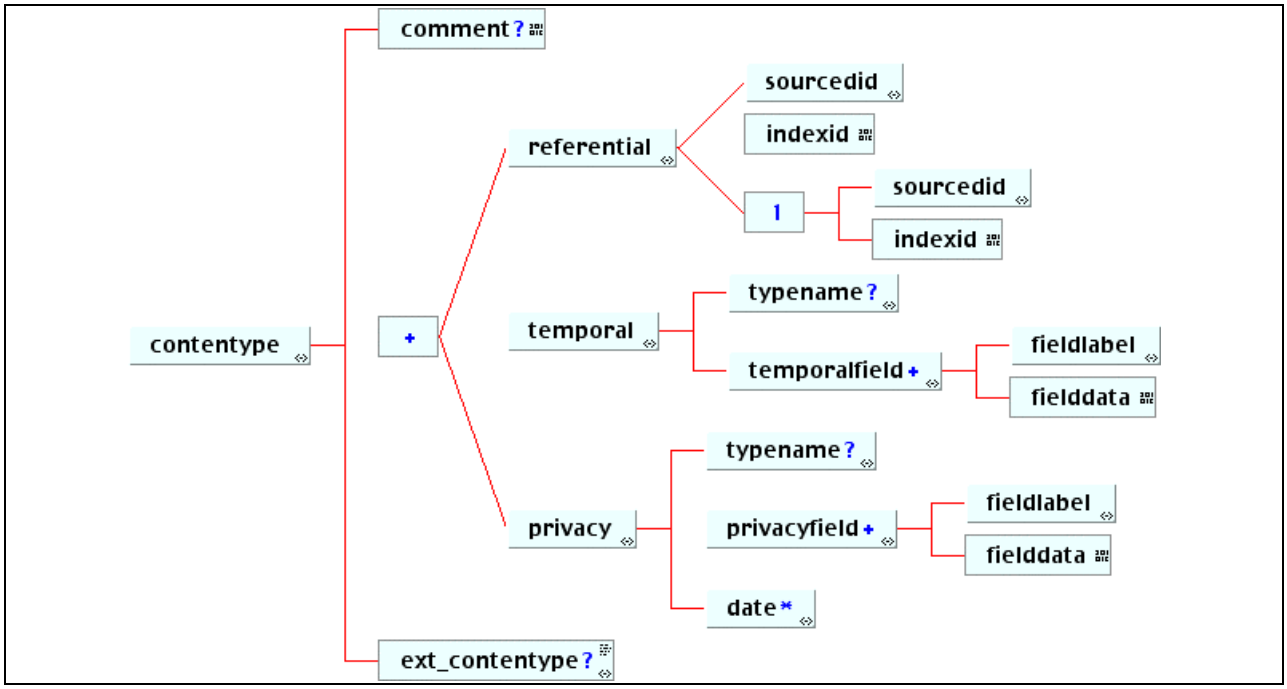

Figure 3.28 <contentype> elements.

3.13.2.1 <comment>

Description: This element contains the comments that are relevant to the structure as a whole.

Multiplicity: Occurs zero or once within the <contentype> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.13.2.2 <referential>

Description: The referential information is used to uniquely identify the learner information record as a whole and the individual data components within that record. These enable each piece of information to be identified. The actual identification system is outside the scope of this specification.

Multiplicity: Occurs once or more times within the <contentype> element.

Attributes: None.

Elements:
- sourcedid
- indexid

3.13.2.3 <temporal>

Description: This information is used to describe any time-based dependencies of the data. This includes information such as the date of creation, time-stamp and expiry date of the learner information. The date/time descriptions are expected to conform to the ISO8601 standard.

Multiplicity: Occurs zero or more times within the <contentype> element.

Attributes: None.

Elements:
- typename
- temporalfield

3.13.2.4 <typename>

Description: This element presents the default vocabulary that is made available to identify the type of referential information. If the standard vocabulary is insufficient then an alternative entry must be used through the <tysource> element.

Multiplicity: Occurs zero or once within the <referential> element.

Attributes: None.

3.13.2.5 <temporalfield>

Description: The container for the quantification of the temporal data objects.

Multiplicity: Occurs once or more times within the <temporal> element.

Attributes: None.

Elements:
- fieldlabel
- fielddata

3.13.2.6 <privacy>

Description: All of the data relevant to the privacy, authenticity and integrity of the learner information is contained within this structure. The actual privacy etc. mechanism and architectures used to support the learner information are outside of the scope of the specification but they interact with the learner information through these structures.

Multiplicity: Occurs zero or more times within the <contentype> element.

Attributes: None.

Elements:
- typename
- privacyfield

3.13.2.7 <typename>

Description: This element presents the default vocabulary that is made available to identify the type of privacy information. If the standard vocabulary is insufficient then an alternative entry must be used through the <tysource> element.

Multiplicity: Occurs zero or once within the <privacy> element.

Attributes: None.

3.13.2.8 <privacyfield>

Description: The container for the quantification of the privacy data objects.

Multiplicity: Occurs once or more times within the <privacy> element.

Attributes: None.

Elements:
- fieldlabel
- fielddata

3.13.2.9 <ext_contentype>

Description: This element contains the proprietary extensions to the <contentype> element.

Multiplicity: Occurs zero or once within the <contentype> element.

Attributes: None.

3.13.3 <description> Elements

Description: Many of the data objects require the storage of the appropriate content, including brief descriptions of the nature of the material being stored or referenced. Three classification of description are supported and it is an implementation issue for how each of these classes are used and processed.

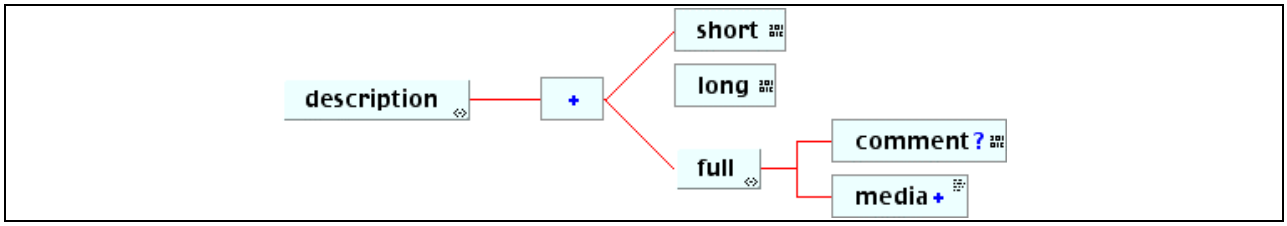

Figure 3.29 <description> elements.

Attributes: None.

Elements:
- short
- long
- full

Example:

```
<description>
    <short>A very short statement.</short>
    <long>This is a long text statement in which the number of characters used
           exceeds 255.  The intention is for this type of element to be used to
           store the bulk of the text-based messages.  Paragraphs that are under
           255 characters can also be stored herein. This is a long text
```

```
            statement in which the number of characters used exceeds 255.  The
            intention is for this type of element to be used to store the bulk of
            the text-based messages.
    </long>
    <full>
        <media mediamode="text" mimetype="image/gif" encoding="uri">student1/essay1.doc
        </media>
        <media mediamode="image" mimetype="image/gif" encoding="uri">student1/photo1.gif
        </media>
    </full>
</description>
```

3.13.3 <short>

Description: This element contains the short textual material that forms the description. 'Short text' is text that is 1-255 characters. The entry format is a string.

Multiplicity: Occurs zero or more times within the <description> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.13.3 <long>

Description: This element contains the long textual material that forms the description. 'Long text' is text that exceeds 255 characters. The entry format is a string.

Multiplicity: Occurs zero or more times within the <description> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

3.13.3 <full>

Description: This element contains all of the necessary content material that forms the description e.g. text, images, video, etc.

Multiplicity: Occurs zero or more times within the <description> element.

Attributes: None.

Elements:

- comment
- media

3.13.4 <date> Elements

Description: Many data objects require the storage of an appropriate date so that the appropriate time-based consideration of the information can be used.

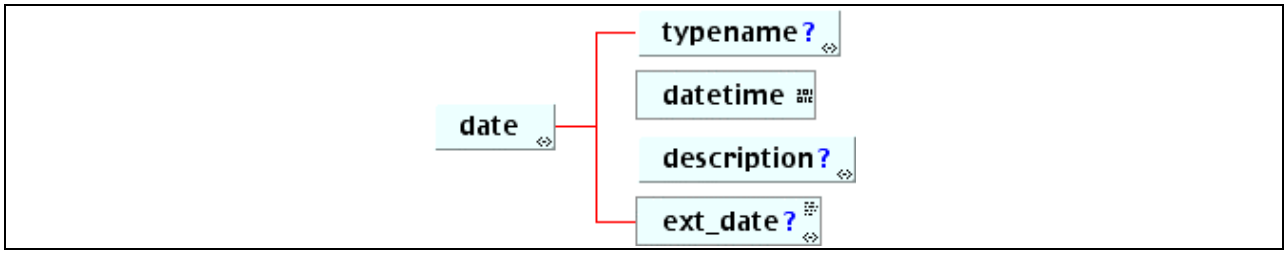

Figure 3.30 <date> elements.

Attributes: None.

Elements:

- typename
- datetime
- description
- ext_date

Example:

```
<date>
    <typename>
        <tysource sourcetype="imsdefault"/>
        <tyvalue>Award</tyvalue>
    </typename>
    <datetime>2000:11:06</datetime>
    <description>
        <short>The date of the ward</short>
    </description>
</date>
```

3.13.4.1 <typename>

Description: This element presents the default vocabulary that is made available to identify the type of date information. If the standard vocabulary is insufficient then an alternative entry must be used through the <tysource> element.

Multiplicity: Occurs zero or once within the <activity> element.

Attributes: None.

3.13.4.2 <datetime>

Description: The actual date and time entry. The format of this information is based upon the ISO8601 standard i.e. YYYY:MM:DDTHH:MM:SS for year, month, day, hour, minute and second entries respectively. The entry format is a string.

Attributes: None.

3.13.5 <priority> Elements

Description: The priority to be assigned to the encapsulating data object. For example, this is used to define the priority of a goal and/or its associated sub-goals. The entry format is a string.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification. Data-type = string.

Example:

```
<priority>Primary</priority>
```

3.13.6 <status> Elements

Description: The status of a variety of data objects is supported using this structure. A data object may have several associated states but each status must be transferred using its own data structure.

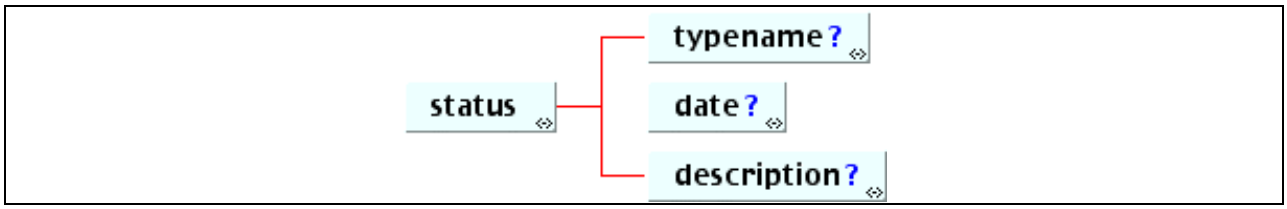

Figure 3.31 <status> elements.

Attributes: None.

Elements:
- typename
- date

Example:

```
<status>
    <typename>
        <tysource sourcetype="imsdefault"/>
        <tyvalue>Active</tyvalue>
    </typename>
    <date>
        <typename>
            <tysource sourcetype="imsdefault"/>
            <tyvalue>Entered</tyvalue>
        </typename>
        <datetime>1926:3:30</datetime>
    </date>
    <description>
        <short>Active operation</short>
    </description>
</status>
```

3.13.6.1 <typename>

Description: This element presents the default vocabulary that is made available to identify the type of status information. If the standard vocabulary is insufficient then an alternative entry must be used through the <tysource> element.

Multiplicity: Occurs zero or once within the <status> element.

Attributes: None.

3.13.7 <product> Elements

Description: The product data structure is used to contain the materials created by the learner. These materials may be created as part of formal activities and can take any electronic form e.g. text, graphic, etc.

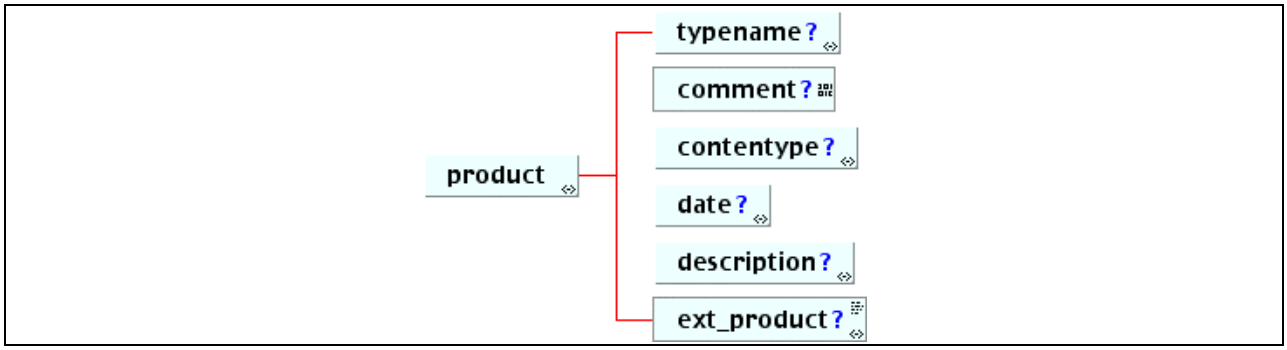

Figure 3.32 <product> elements.

Attributes: None.

Elements:
- typename
- comment
- date
- description
- ext_product

Example:

```
<product>
    <typename>
        <tysource sourcetype="imsdefault"/>
```

```
        <tyvalue>Coursework</tyvalue>
    </typename>
    <contentype>
        <referential>
            <indexid>product_01</indexid>
        </referential>
    </contentype>
    <description>
        <full>
            <media mediamode="text" mimetype="image/gif" encoding="uri">student1/essay1.doc
            </media>
        </full>
    </description>
</product>
```

3.13.6.1 <typename>

Description: This element presents the default vocabulary that is made available to identify the type of product information. If the standard vocabulary is insufficient then an alternative entry must be used through the <tysource> element.

Multiplicity: Occurs zero or once within the <roduct> element.

Attributes: None.

3.13.8 <typename> Elements

Description: The typename data structure is used to extend the basic vocabularies defined for a particular data structure. This extension mechanism is based upon referencing the new vocabulary set followed by identifying the term selected from that vocabulary. It is possible to simply state the selected phrase without defining reference set however this means that it will not be possible for the receiving system to validate the selection against a known reference vocabulary.

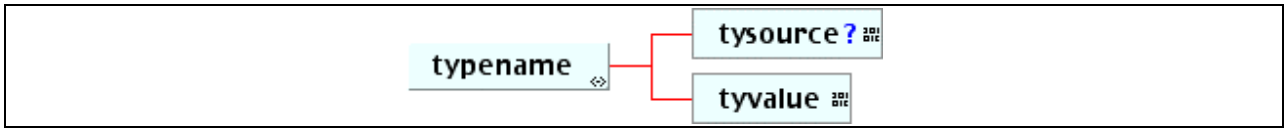

Figure 3.33 <typename> elements.

Attributes: None.

Elements:

- tysource
- tyvalue

Example:

```
<typename>
    <tysource sourcetype="List">Monday, Tuesday, Wednesday, Thursday, Friday</tysource>
    <tyvalue>Tuesday</tyvalue>
</typename>
```

3.13.8.1 <tysource>

Description: The tysource element is used to define the set of entries that constitute the vocabulary. This extension can be realised through the actual phrases themselves, a URI to a file containing the vocabulary or to an external identifier of that vocabulary.

Attributes:

- **sourcetype (required selection from the enumerated list of: list, imsdefault, proprietary, standard).** Identifies the type of vocabulary with the 'imsdefault' entry referring to the default IMS vocabulary that corresponds to the context. The 'list' entry requires the actual vocabulary to be supplied in the body of the element. The 'standard' and 'proprietary' entries would have the corresponding URL or logical identifier given

as the body of the element.
Data-type = Enumerated list.

Elements: None.

3.13.8.2 <tyvalue>

Description: The tyvalue element is used to select the entry in the vocabulary identified using the <tysource> element.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification.
  Data-type = string.

Elements: None.

3.13.9 <fieldlabel> Elements

Description: The fieldlabel element is used to construct arbitrarily named data structures. The fieldlabel entry is used to state the name of the associated data field with the fielddata element containing the actual value of the data field. Multiple occurrences can be used to construct complex data structures.

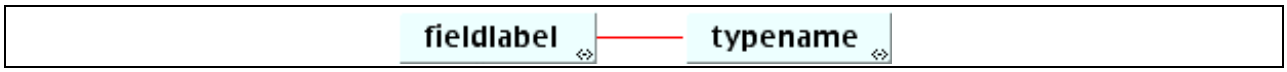

Figure 3.34 <fieldlabel> elements.

Attributes: None.

Elements:
- typename

Example:

```
<fieldlabel>
    <typename>
        <tyvalue>Grade</tyvalue>
    </typename>
</fieldlabel>
```

3.13.10 <fielddata> Elements

Description: The fielddata element is used to store data in an arbitrarily defined data structure. This element is always used in conjunction with the fieldtype element. The fieldlabel element names the data field and the fielddata gives the associated data for that field.

Attributes: None.

Elements: None.

Example:

```
<fielddata>data</fielddata>
```

3.13.11 <media> Elements

Description: This element is used to contain the electronic materials themselves. Each piece of material is contained within its own element.

Attributes:

- **mediamode (required selection from the enumerated list of: Text, Image, Video, Audio, Applet, Application).** Identifies the type of media content that is to be included or referenced.
  Data-type = Enumerated list.

- **mimetype (required string entry as per the mimetype definition of RFC1521).** Identifies the mime-type of media content that is to be included or referenced e.g. image/gif.
  Data-type = String containing a MIME type.
- **contentreftype (selection from the enumerated list: Base64: uri, entityref, Base-64. Default=Base64).** Identifies the type of media encoding. Base64 is used if the material is enclosed between the tags themselves.
  Data-type = Enumerated list.

Elements: None.

Example:

```
<media mediamode="Image" mimetype="image/gif" contentreftype="uri">directoryname/filename.gif
</media>
```

3.13.12 <text> Elements

Description: The text element is used to contain any text entry information e.g. a paragraph of text submitted as content.

Attributes:

- **xml:lang (optional - default = 'en').** Identifies the language that is to be used within the instance. The default is set as English but the potential range of languages is defined as per the XML W3C specification.
  Data-type = string.
- **uri (optional).** The universal resource indicator that identifies an external reference. The structure is as per the W3C specification.
  Data-type = string [1-128 characters].
- **entityref (optional).** An external reference linked using the XML ENTITY structure.
  Data-type = string [1-128 characters].

Elements: None.

Example:

```
<text xml:lang="en">Any string of any language.</text>
```

3.13.13 <organization> Elements

Description: The organisation element is used to identify the name and type of organisation that is to be associated with a particular data entry e.g. the body responsible for awarding a qualification.

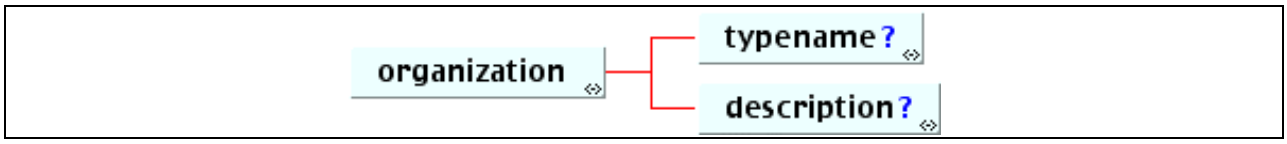

Figure 3.35 <organization> elements.

Attributes: None.

Elements:

- typename
- description

Example:

```
<organization>
    <typename>
        <tysource sourcetype="imsdefault"/>
        <tyvalue>Education</tyvalue>
    </typename>
    <description>
```

```
        <short>MIT</short>
    </description>
</organization>
```

3.13.13.1 <typename>

Description: This element presents the default vocabulary that is made available to identify the type of organization information. If the standard vocabulary is insufficient then an alternative entry must be used through the <tysource> element.

Multiplicity: Occurs zero or once within the <organization> element.

Attributes: None.

3.13.14 <exrefrecord> Elements

Description: The exrefrecord element is used to reference external content that can have any format. The format of the material and the material itself is defined either by inclusion in the data structure or by external reference to it.

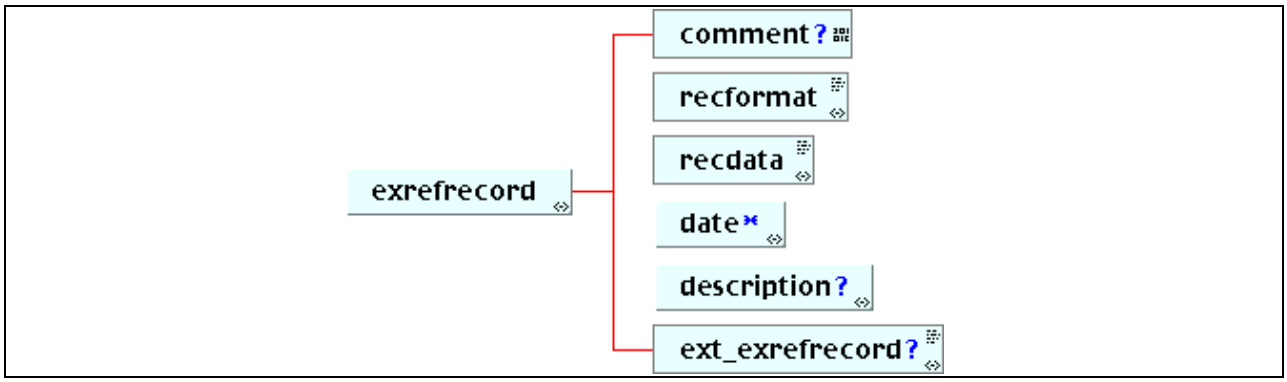

Figure 3.36 <exrefrecord> elements.

Attributes: None.

Elements:

- comment
- recformat
- recdata
- date
- description
- extension

Example:

```
<exrefrecord>
    recformat>MSWord98</recformat>
    <recdata uri="directoryname/filename.doc"/>
    <date>
        <stddate mode="Award"/>
        <datetime>1920:9:30</datetime>
    </date>
</exrefrecord>
```

3.13.14.1 <recformat>

Description: The recformat element is used to define the format of the material. This format could be defined explicitly as a file type e.g. ‘pdf’, or detailed description of the format using a predefined language (this language is outside the scope of this specification).

Attributes:

- **uri (optional).** The universal resource indicator that identifies an external reference. The structure is as per the W3C specification.
  Data-type = string [1-128 characters].

Elements: ANY.

3.13.14.2 <recdata>

Description: The recdata element is used to contain or to reference the actual material itself.

Attributes:

- **uri (optional).** The universal resource indicator that identifies an external reference. The structure is as per the W3C specification.
  Data-type = string [1-128 characters].

Elements: ANY.

3.13.15 <sourcedid> Elements

Description: The sourcedid element is used to contain the LIP's global user identifier. This element is a placeholder for that information, the manner in which it is generated is beyond the scope of this specification.

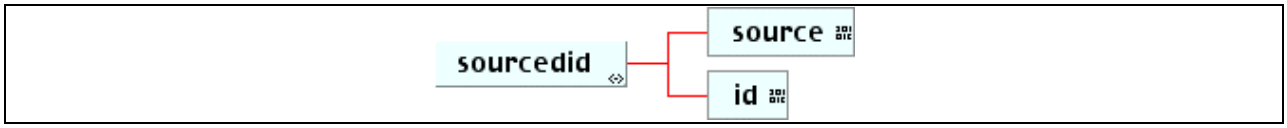

Figure 3.37 <sourcedid> elements.

Attributes: None.

Elements:
- source
- id

Example:

```
<sourcedid>
    <source>Identifier Allocation Identity</source>
    <id>Generic user identifier</id>
</sourcedid>
```

3.13.15.1 <source>

Description: The source identifier of the sourcedid. This source is the globally unique identifier assigned to the organisation responsible for the allocation of the unique identifier to this data structure.

Attributes: None.

Elements: None.

3.13.15.2 <id>

Description: The unique identifier assigned to the associated data structure. This identifier is unique in the context of the 'source' identifier. Together the 'source' and 'id' elements are the globally unique identifier for the data structure. It is the responsibility of the organisation identified by the source to uniquely allocate the 'id' identifiers.

Attributes: None.

Elements: None.

3.13.16 <indexid> Elements

Description: The indexing facility for the data object. This index reference is unique with respect to the core learner 'sourcedid'. Multiple references to the same data object should entail the use of the same 'indexid'. The entry format is a string

Attributes: None.

Elements: None.

4. Physical Realisation of the XML Binding

The XML Binding has been realised as XSD and DTD. The DTD realisation, shown in Appendix A, is a single file. The XSD is implemented a series of files which are linked using the XML XSD 'include' statement. The reasons for this approach are:

- Ease of maintainability – the complexity of the full LIP XML binding means that any change will require amendment of the whole binding. By breaking the binding into many smaller components it will be easier to anticipate the ways in which a change will alter the nature of the full binding thereby easing maintainability;
- Increased flexibility – whenever new alternative XML bindings for the corresponding data objects are created then these can be included within the XSD without recourse to changing the LIP-XML instances. This approach will be used when the new IMS Competency Definition and IMS Accessibility working-groups finalise their own XML Bindings.

The XSD files created to realise the binding are (the actual contents of these files are listed in Appendix A):

- The bindings that are defined for each of the core data structures are:
  - 'ims_lip_activityv1p0.xsd' – the activity core data structure
  - 'ims_lip_affiliation v1p0.xsd' – the affiliation core data structure
  - 'ims_lip_competency v1p0.xsd' – the competency core data structure
  - 'ims_lip_goal v1p0.xsd' – the goal core data structure
  - 'ims_lip_identification v1p0.xsd' – the identification core data structure
  - 'ims_lip_interest v1p0.xsd' – the interest core data structure
  - 'ims_lip_qxl v1p0.xsd' – the qcl core data structure
  - 'ims_lip_relationship v1p0.xsd' – the relationship core data structure
  - 'ims_lip_securitykey v1p0.xsd' – the securitykey core data structure
  - 'ims_lip_transcript v1p0.xsd' – the transcript core data structure
- The bindings that are defined to support the common data structures are:
  - 'ims_lip_attributes v1p0.xsd' – the commonly defined set of attributes used by the data objects
  - 'ims_lip_commonLIP v1p0.xsd' – the commonly defined set of structures as used by the data objects
  - 'ims_lip_description v1p0.xsd' – the description structure as used by many of the data objects
  - 'ims_lip_evaluation v1p0.xsd' – the evaluation structure as used by the 'activity' data object
  - 'ims_lip_exrefrecord v1p0.xsd' – the exrefrecord structure as used by the 'competency' and 'transcript' data objects
  - 'ims_lip_extension v1p0.xsd' – the set of extension data objects
  - 'ims_lip_media v1p0.xsd' – the media structure as used by the 'description' data object
  - 'ims_lip_organization v1p0 v1p0.xsd' – the organization structure as used by the 'qcl' and 'affiliation' data objects
  - 'ims_lip_role.xsd' – the role structure as used by the 'affiliation' data object
  - 'ims_lip_tuple v1p0.xsd' – the tuple structure as used by the 'relationship' data object;
- The binding defined as the root structure is:
  - 'ims_lip_rootv1p0.xsd' – the root structure for the LIP. It is this file that is named within the LIP-XML instances themselves.

The ‘include’ hierarchy for these files is shown in Figure 4.1 (all of these files have ‘v1p0.xsd’ as their extension and start with the string ‘ims_lip_’).

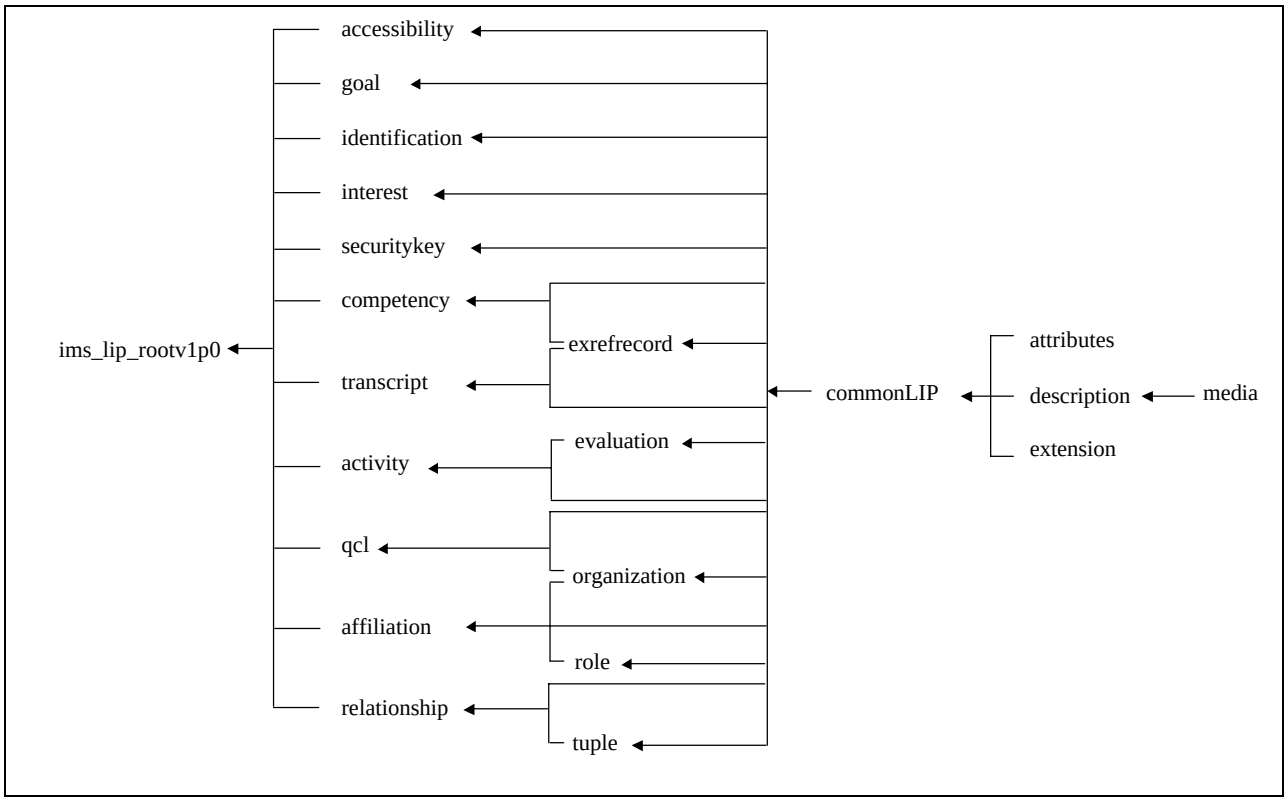

Figure 4.1 XML schema inclusion hierarchy.

Figure 4.1 should be read from left to right and top to bottom. Thus, the root file, ‘ims_lip_rootv1p0.xsd’, includes the eleven core data objects, each of which include the ‘commonLIP’ file plus others as appropriate.

5. Examples in XML

Each of the following simple examples focuses on one of the core data structures. In each case it is assumed that the full set of information is being supplied. Each of the following examples refers to the same learner, identified by the 'sourcedid' of <source> 'IMS_LIP_V1p0_Example' and <id> '1001'.

5.1 <identification>

The <identification> example presents the details for a 'Sherlock Holmes'. The details include his formatted name, name, address, telephone, demographic and agent details.

```
1       <learnerinformation>
2           <comment>An example of LIP Identification information.</comment>
3           <contentype>
4               <referential>
5                   <sourcedid>
6                       <source>IMS_LIP_V1p0_Example</source>
7                       <id>1001</id>
8                   </sourcedid>
9               </referential>
10          </contentype>
11          <identification>
12              <comment>----------------------------------------Identification</comment>
13              <contentype>
14                  <referential>
16                      <indexid>identification_01</indexid>
17                  </referential>
18              </contentype>
19              <formname>
20                  <typename>
21                      <tysource sourcetype="imsdefault"/>
22                      <tyvalue>Preferred</tyvalue>
23                  </typename>
24                  <comment>---------------------------Formatted Name details</comment>
25                  <contentype>
26                      <referential>
27                          <indexid>formname_01</indexid>
28                      </referential>
29                  </contentype>
30                  <text>Mr Sherlock Holmes</text>
31              </formname>
32              <name>
33                  <typename>
34                      <tysource sourcetype="imsdefault"/>
35                      <tyvalue>Preferred</tyvalue>
36                  </typename>
37                  <comment>-----------------------------------Name details</comment>
38                  <contentype>
39                      <referential>
40                          <indexid>name_01</indexid>
41                      </referential>
42                  </contentype>
43                  <partname>
44                      <typename>
45                          <tysource sourcetype="imsdefault"/>
46                          <tyvalue>First</tyvalue>
47                      </typename>
48                      <text>Sherlock</text>
49                  </partname>
50                  <partname>
51                      <typename>
52                          <tysource sourcetype="imsdefault"/>
53                          <tyvalue>Last</tyvalue>
54                      </typename>
55                      <text>Holmes</text>
56                  </partname>
```

```
57              </name>
58              <address>
59                  <typename>
60                      <tysource sourcetype="imsdefault"/>
61                      <tyvalue>Permanent</tyvalue>
62                  </typename>
63                  <comment>---------------------------------Address details</comment>
64                  <contentype>
65                      <referential>
66                          <indexid>address_01</indexid>
67                      </referential>
68                  </contentype>
69                  <street>
70                      <streetname>Baker Street</streetname>
71                      <aptnumber>22</aptnumber>
72                      <aptnumsuffix>b</aptnumsuffix>
73                  </street>
74                  <city>London</city>
75                  <country>England</country>
76              </address>
77              <contactinfo>
78                  <typename>
79                      <tysource sourcetype="imsdefault"/>
80                      <tyvalue>Private</tyvalue>
81                  </typename>
82                  <comment>---------------------------------Contact details</comment>
83                  <contentype>
84                      <referential>
85                          <indexid>contactinfo_01</indexid>
86                      </referential>
87                  </contentype>
88                  <telephone>
89                      <countrycode>44</countrycode>
90                      <areacode>020</areacode>
91                      <indnumber>6472239</indnumber>
92                  </telephone>
93              </contactinfo>
94              <demographics>
95                  <typename>
96                      <tysource sourcetype="imsdefault"/>
97                      <tyvalue>Adult</tyvalue>
98                  </typename>
99                  <comment>-----------------------------Demographic details</comment>
100                 <contentype>
101                     <referential>
102                         <indexid>demographics_01</indexid>
103                     </referential>
104                 </contentype>
105                 <gender gender="M"/>
106                 <date>
107                     <typename>
108                         <tysource sourcetype="imsdefault"/>
109                         <tyvalue>Birth</tyvalue>
110                     </typename>
111                     <datetime>1901:04:01</datetime>
112                 </date>
113             </demographics>
114             <agent>
115                 <typename>
116                     <tysource sourcetype="imsdefault"/>
117                     <tyvalue>Aide</tyvalue>
118                 </typename>
119                 <comment>-----------------------------------Agent details</comment>
120                 <contentype>
121                     <referential>
122                         <indexid>agent_01</indexid>
123                     </referential>
124                 </contentype>
125                 <agentid>Dr.Watson</agentid>
126                 <agentdomain>
127                     <typename>
```

```
128                         <tysource sourcetype="imsdefault"/>
129                         <tyvalue>Medical</tyvalue>
130                     </typename>
131                 </agentdomain>
132             </agent>
133         </identification>
134     </learnerinformation>
```

5.2 <goal>

The <goal> example shows that Sherlock Holmes' primary objective is to arrest Moriarty. A picture of Moriarty has been included. Two sub-goals have also been described.

```
1       <learnerinformation>
2           <comment>An example of LIP Goal information.</comment>
3           <contentype>
4               <referential>
5                   <sourcedid>
6                       <source>IMS_LIP_V1p0_Example</source>
7                       <id>1001</id>
8                   </sourcedid>
9               </referential>
10          </contentype>
11          <goal>
12              <typename>
13                  <tysource sourcetype="imsdefault"/>
14                  <tyvalue>Work</tyvalue>
16              </typename>
17              <contentype>
18                  <referential>
19                      <indexid>goal_01</indexid>
20                  </referential>
21              </contentype>
22              <date>
23                  <typename>
24                      <tysource sourcetype="imsdefault"/>
25                      <tyvalue>Start</tyvalue>
26                  </typename>
27                  <datetime>1925</datetime>
28              </date>
29              <priority>Primary Objective</priority>
30              <status>
31                  <typename>
32                      <tysource sourcetype="imsdefault"/>
33                      <tyvalue>Active</tyvalue>
34                  </typename>
35                  <date>
36                      <typename>
37                          <tysource sourcetype="imsdefault"/>
38                          <tyvalue>Create</tyvalue>
39                      </typename>
40                      <datetime>1926:3:30</datetime>
41                  </date>
42              </status>
43              <description>
44                  <short>To arrest Moriarty</short>
45                  <full>
46                      <media mediamode="Image" mimetype="image/gif" contentreftype="uri">
47                          sh/moriarty.gif
48                      </media>
49                  </full>
50              </description>
51              <goal>
52                  <typename>
53                      <tysource sourcetype="imsdefault"/>
```

```
54                      <tyvalue>Work</tyvalue>
55                  </typename>
56                  <contentype>
57                      <referential>
58                          <indexid>goal_01_subgoal_01</indexid>
59                      </referential>
60                  </contentype>
61                  <description>
62                      <short>To locate Moriarty</short>
63                  </description>
64              </goal>
65              <goal>
66                  <typename>
67                      <tysource sourcetype="imsdefault"/>
68                      <tyvalue>Work</tyvalue>
69                  </typename>
70                  <contentype>
71                      <referential>
72                          <indexid>goal_01_subgoal_02</indexid>
73                      </referential>
74                  </contentype>
75                  <description>
76                      <short>Train Watson to be a competent detective.</short>
77                  </description>
78              </goal>
79          </goal>
80      </learnerinformation>
```

5.3 <qcl>

In the <qcl> example a first class honours degree awarded in 1920 from Cambridge University is identified. An electronic 'gif' image of the certificate is also included.

```
1       <learnerinformation>
2           <comment>An example of LIP Qualification, Certification and Licence.</comment>
3           <contentype>
4               <referential>
5                   <sourcedid>
6                       <source>IMS_LIP_V1p0_Example</source>
7                       <id>1001</id>
8                   </sourcedid>
9               </referential>
10          </contentype>
11          <qcl>
12              <typename>
13                  <tysource sourcetype="imsdefault"/>
14                  <tyvalue>Qualification</tyvalue>
16              </typename>
17              <contentype>
18                  <referential>
19                      <indexid>qcl_01</indexid>
20                  </referential>
21              </contentype>
22              <title>MA Criminology</title>
23              <organization>
24                  <typename>
25                      <tysource sourcetype="imsdefault"/>
26                      <tyvalue>Educational</tyvalue>
27                  </typename>
28                  <description>
29                      <short>Cambridge University</short>
30                  </description>
31              </organization>
32              <level><text>First Class Honours</text></level>
33              <date>
```

```
34                  <typename>
35                      <tysource sourcetype="imsdefault"/>
36                      <tyvalue>Award</tyvalue>
37                  </typename>
38                  <datetime>1920</datetime>
39              </date>
40              <description>
41                  <full>
42                      <media mediamode="Image" mimetype="image/gif"
43                          contentreftype="uri">holmes/degree.gif
44                      </media>
45                  </full>
46              </description>
47          </qcl>
48      </learnerinformation>
```

5.4 <activity>

In the <activity> the summary information concerning a course is presented. This summary information describes the length of the course, the credit score and includes reference to the thesis written by the student and the accompanying tutor's testimonial.

```
1       <learnerinformation>
2           <comment>An example of LIP Activity information.</comment>
3           <contentype>
4               <referential>
5                   <sourcedid>
6                       <source>IMS_LIP_V1p0_Example</source>
7                       <id>1001</id>
8                   </sourcedid>
9               </referential>
10          </contentype>
11          <activity>
12              <typename>
13                  <tysource sourcetype="imsdefault"/>
14                  <tyvalue>Education</tyvalue>
16              </typename>
17              <contentype>
18                  <referential>
19                      <indexid>activity_1</indexid>
20                  </referential>
21              </contentype>
22              <date>
23                  <typename>
24                      <tysource sourcetype="imsdefault"/>
25                      <tyvalue>Award</tyvalue>
26                  </typename>
27                  <datetime>1919:7</datetime>
28              </date>
29              <status>
30                  <typename>
31                      <tysource sourcetype="imsdefault"/>
32                      <tyvalue>Completed</tyvalue>
33                  </typename>
34                  <date>
35                      <typename>
36                          <tysource sourcetype="imsdefault"/>
37                          <tyvalue>Finish</tyvalue>
38                      </typename>
39                      <datetime>1919:6</datetime>
40                  </date>
41              </status>
42              <units>
43                  <unitsfield>
44                      <fieldlabel>
```

```
                        <typename>
                            <tyvalue>CreditNumber</tyvalue>
                        </typename>
                    </fieldlabel>
                    <fielddata>10</fielddata>
                </unitsfield>
            </units>
            <learningactivityref>
                <text>Degree in Philiosphy</text>
            </learningactivityref>
            <definition>
                <typename>
                    <tysource sourcetype="imsdefault"/>
                    <tyvalue>Curriculum</tyvalue>
                </typename>
                <contentype>
                    <referential>
                        <indexid>degreecourse</indexid>
                    </referential>
                </contentype>
                <definitionfield>
                    <fieldlabel>
                        <typename>
                            <tyvalue>Duration</tyvalue>
                        </typename>
                    </fieldlabel>
                    <fielddata>3</fielddata>
                </definitionfield>
            </definition>
            <product>
                <typename>
                    <tysource sourcetype="imsdefault"/>
                    <tyvalue>Coursework</tyvalue>
                </typename>
                <contentype>
                    <referential>
                        <indexid>activity_product_01</indexid>
                    </referential>
                </contentype>
                <description>
                    <short>Thesis on violins</short>
                    <full>
                        <media mediamode="Text" mimetype="text/word" contentreftype="uri">
                            sh/thesis.doc
                        </media>
                    </full>
                </description>
            </product>
            <testimonial>
                <typename>
                    <tysource sourcetype="imsdefault"/>
                    <tyvalue>Academic</tyvalue>
                </typename>
                <contentype>
                    <referential>
                        <indexid>activity_testimonial_01</indexid>
                    </referential>
                </contentype>
                <description>
                    <short>Tutors reference</short>
                    <full>
                        <media mediamode="Text" mimetype="text/word" contentreftype="uri">
                            tutor/ref.doc
                        </media>
                    </full>
                </description>
            </testimonial>
            <evaluation>
                <contentype>
                    <referential>
                        <indexid>activity_evaluation_01</indexid>
```

```
116                 </referential>
117             </contentype>
118             <result>
119                 <interpretscore>
120                     <fieldlabel>
121                         <typename>
122                             <tyvalue>MinScore</tyvalue>
123                         </typename>
124                     </fieldlabel>
125                     <fielddata>0</fielddata>
126                 </interpretscore>
127                 <interpretscore>
128                     <fieldlabel>
129                         <typename>
130                             <tyvalue>MaxScore</tyvalue>
131                         </typename>
132                     </fieldlabel>
133                     <fielddata>100</fielddata>
134                 </interpretscore>
135                 <score>
136                     <fieldlabel>
137                         <typename>
138                             <tyvalue>Total</tyvalue>
139                         </typename>
140                     </fieldlabel>
141                     <fielddata>80</fielddata>
142                 </score>
143             </result>
144         </evaluation>
145         <description>
146             <short>Final degree information.</short>
147         </description>
148     </activity>
149 </learnerinformation>
```

5.5 <competency>

In this <competency> format external reference is made to a document that contains the competencies. The file containing the context for the competencies description is also supplied.

```
1   <learnerinformation>
2       <comment>An example of LIP Competency information.</comment>
3       <contentype>
4           <referential>
5               <sourcedid>
6                   <source>IMS_LIP_V1p0_Example</source>
7                   <id>1001</id>
8               </sourcedid>
9           </referential>
10      </contentype>
11      <competency>
12          <contentype>
13              <referential>
14                  <indexid>competency_01</indexid>
16              </referential>
17          </contentype>
18          <exrefrecord>
19              <recformat uri="compformats/criminology.doc"/>
20              <recdata uri="holmes/competency.doc"/>
21              <date>
22                  <typename>
23                      <tysource sourcetype="imsdefault"/>
24                      <tyvalue>Award</tyvalue>
25                  </typename>
26                  <datetime>1927:10:21</datetime>
```

```
27                </date>
28            </exrefrecord>
29            <description>
30                <short>Competencies in Criminology</short>
31            </description>
32        </competency>
33    </learnerinformation>
```

5.6 <transcript>

In this <transcript> format external reference is made to a document that contains the transcript. The file containing the context for the transcript description is also supplied.

```
1     <learnerinformation>
2         <comment>An example of LIP Transcript information.</comment>
3         <contentype>
4             <referential>
5                 <sourcedid>
6                     <source>IMS_LIP_V1p0_Example</source>
7                     <id>1001</id>
8                 </sourcedid>
9             </referential>
10        </contentype>
11        <transcript>
12            <typename>
13                <tysource sourcetype="imsdefault"/>
14                <tyvalue>Academic</tyvalue>
16            </typename>
17            <contentype>
18                <referential>
19                    <indexid>transcript_01</indexid>
20                </referential>
21            </contentype>
22            <exrefrecord>
23                <recformat>MSWord98</recformat>
24                <recdata uri="holmes/cambridge_degree.doc"/>
25                <date>
26                <typename>
27                    <tysource sourcetype="imsdefault"/>
28                    <tyvalue>Award</tyvalue>
29                </typename>
30                    <datetime>1920:9:30</datetime>
31                </date>
32            </exrefrecord>
33            <description>
34                <short>Cambridge University Transcript</short>
35            </description>
36        </transcript>
37    </learnerinformation>
```

5.7 <accessibility>

The <accessibility> example shows the language proficiencies in ‘French’, and an input technology preference. The <disability> and <eligibility> elements are just frameworks - these will be developed further in later releases of the specification.

```
1     <learnerinformation>
2         <comment>An example of LIP Accessibility information.</comment>
3         <contentype>
```

```
4               <referential>
5                   <sourcedid>
6                       <source>IMS_LIP_V1p0_Example</source>
7                       <id>1001</id>
8                   </sourcedid>
9               </referential>
10          </contentype>
11          <accessibility>
12              <contentype>
13                  <referential>
14                      <indexid>accessibility_01</indexid>
16                  </referential>
17              </contentype>
18              <language>
19              <typename>
20                  <tysource sourcetype="imsdefault"/>
21                  <tyvalue>German</tyvalue>
22              </typename>
23                  <comment>----------------------------------------Language</comment>
24                  <contentype>
25                      <referential>
26                          <indexid>language_01</indexid>
27                      </referential>
28                  </contentype>
29                  <proficiency profmode="OralSpeak">Excellent</proficiency>
30                  <proficiency profmode="OralComp">Excellent</proficiency>
31                  <proficiency profmode="Read">Good</proficiency>
32                  <proficiency profmode="Write">Poor</proficiency>
33              </language>
34              <preference>
35                  <typename>
36                      <tysource sourcetype="imsdefault"/>
37                      <tyvalue>InputTech</tyvalue>
38                  </typename>
39                  <comment>---------------------------------------Preference</comment>
40                  <contentype>
41                      <referential>
42                          <indexid>preference_01</indexid>
43                      </referential>
44                  </contentype>
45                  <prefcode>Large Font Display Devices</prefcode>
46              </preference>
47              <eligibility>
48                  <comment>-------------------------------------Eligibility</comment>
49                  <contentype>
50                      <referential>
51                          <indexid>eligibility_01</indexid>
52                      </referential>
53                  </contentype>
54              </eligibility>
55              <disability>
56                  <comment>-------------------------------------Disability</comment>
57                  <contentype>
58                      <referential>
59                          <indexid>disability_01</indexid>
60                      </referential>
61                  </contentype>
62              </disability>
63          </accessibility>
64      </learnerinformation>
```

5.8 <interest>

The interest is Sherlock Holmes' hobby of playing the violin. A picture of the violin is included as a product from the hobby.

```
1       <learnerinformation>
2           <comment>An example of LIP Interest information.</comment>
3           <contentype>
4               <referential>
5                   <sourcedid>
6                       <source>IMS_LIP_V1p0_Example</source>
7                       <id>1001</id>
8                   </sourcedid>
9               </referential>
10          </contentype>
11          <interest>
12              <typename>
13                  <tysource sourcetype="imsdefault"/>
14                  <tyvalue>Recreational</tyvalue>
16              </typename>
17              <contentype>
18                  <referential>
19                      <indexid>interest_01</indexid>
20                  </referential>
21              </contentype>
22              <product>
23                  <typename>
24                      <tysource sourcetype="imsdefault"/>
25                      <tyvalue>Portfolio</tyvalue>
26                  </typename>
27                  <contentype>
28                      <referential>
29                          <indexid>product_01</indexid>
30                      </referential>
31                  </contentype>
32                  <date>
33                      <typename>
34                          <tysource sourcetype="imsdefault"/>
35                          <tyvalue>Create</tyvalue>
36                      </typename>
37                      <datetime>1928:10:21</datetime>
38                  </date>
39                  <description>
40                      <short>A picture of the violin</short>
41                      <full>
42                          <media mediamode="Image" mimetype="image/gif" contentreftype="uri">
43                              sh/violin.gif
44                          </media>
45                      </full>
46                  </description>
47              </product>
48              <description>
49                  <short>Music - playing the violin</short>
50              </description>
51          </interest>
52      </learnerinformation>
```

5.9 <affiliation>

The <affiliation> example describes Sherlock Holmes' membership of the London branch of the 'Royal Institution of Criminology' and his role as treasurer in that organisation.

```
1       <learnerinformation>
2           <comment>An example of LIP Affiliation information.</comment>
3           <contentype>
4               <referential>
5                   <sourcedid>
6                       <source>IMS_LIP_V1p0_Example</source>
7                       <id>1001</id>
8                   </sourcedid>
9               </referential>
10          </contentype>
11          <affiliation>
12              <typename>
13                  <tysource sourcetype="imsdefault"/>
14                  <tyvalue>Professional</tyvalue>
16              </typename>
17              <contentype>
18                  <referential>
19                      <indexid>affiliation_01</indexid>
20                  </referential>
21              </contentype>
22              <classification>Fellow</classification>
23              <affiliationid>2457923A</affiliationid>
24              <role>
25                  <typename>
26                      <tysource sourcetype="imsdefault"/>
27                      <tyvalue>Officer</tyvalue>
28                  </typename>
29                  <contentype>
30                      <referential>
31                          <indexid>affiliation_role_01</indexid>
32                      </referential>
33                  </contentype>
34                  <date>
35                      <typename>
36                          <tysource sourcetype="imsdefault"/>
37                          <tyvalue>Start</tyvalue>
38                      </typename>
39                      <datetime>1924:04:01</datetime>
40                  </date>
41                  <date>
42                      <typename>
43                          <tysource sourcetype="imsdefault"/>
44                          <tyvalue>Finish</tyvalue>
45                      </typename>
46                      <datetime>1925:03:31</datetime>
47                  </date>
48                  <description>
49                      <short>Treasurer for the Local Branch of Criminology</short>
50                  </description>
51              </role>
52              <organization>
53                  <typename>
54                      <tysource sourcetype="imsdefault"/>
55                      <tyvalue>Professional</tyvalue>
56                  </typename>
57                  <description>
58                      <short>Royal Institution of Criminology: London Branch</short>
59                  </description>
60              </organization>
61              <date>
62                  <typename>
63                      <tysource sourcetype="imsdefault"/>
```

```
64                      <tyvalue>Join</tyvalue>
65                  </typename>
66                  <datetime>1922</datetime>
67              </date>
68              <status>
69                  <typename>
70                      <tysource sourcetype="imsdefault"/>
71                      <tyvalue>Active</tyvalue>
72                  </typename>
73              </status>
74              <description>
75                  <short>All fees paid</short>
76              </description>
77          </affiliation>
78      </learnerinformation>
```

5.10 <securitykey>

The <securitykey> example defines two passwords that are associated with the learner. The actual passwords themselves have been included however these should be encrypted before inclusion in the instance.

```
1       <learnerinformation>
2           <comment>An example of LIP Securitykey information.</comment>
3           <contentype>
4               <referential>
5                   <sourcedid>
6                       <source>IMS_LIP_V1p0_Example</source>
7                       <id>1001</id>
8                   </sourcedid>
9               </referential>
10          </contentype>
11          <securitykey>
12              <typename>
13                  <tysource sourcetype="imsdefault"/>
14                  <tyvalue>Password</tyvalue>
16              </typename>
17              <contentype>
18                  <referential>
19                      <indexid>securitykey_1</indexid>
20                  </referential>
21              </contentype>
22              <keyfields>
23                  <fieldlabel>
24                      <typename>
25                          <tyvalue>PersonalPassword</tyvalue>
26                      </typename>
27                  </fieldlabel>
28                  <fielddata>asits9</fielddata>
29              </keyfields>
30              <keyfields>
31                  <fieldlabel>
32                      <typename>
33                          <tyvalue>LMSPassword</tyvalue>
34                      </typename>
35                  </fieldlabel>
36                  <fielddata>moriarty</fielddata>
37              </keyfields>
38          </securitykey>
39      </learnerinformation>
```

5.11 <relationship>

The relationship defined in this example is equivalent to saying that: the degree warded to Sherlock Holmes on the basis of the detailed transcript.

```
1       <learnerinformation>
2           <comment>An example of LIP Relationship information.</comment>
3           <contentype>
4               <referential>
5                   <sourcedid>
6                       <source>IMS_LIP_V1p0_Example</source>
7                       <id>1001</id>
8                   </sourcedid>
9               </referential>
10          </contentype>
11          <relationship>
12              <typename>
13                  <tysource sourcetype="imsdefault"/>
14                  <tyvalue>Qcl</tyvalue>
16              </typename>
17              <contentype>
18                  <referential>
19                      <indexid>relationship_01</indexid>
20                  </referential>
21              </contentype>
22              <tuple>
23                  <tuplesource>
24                      <sourcedid>
25                          <source>IMS_LIP_V1p0_Example</source>
26                          <id>1001</id>
27                      </sourcedid>
28                      <indexid>qcl_01</indexid>
29                  </tuplesource>
30                  <tuplerelation>
31                      <typename>
32                          <tyvalue>results_from</tyvalue>
33                      </typename>
34                  </tuplerelation>
35                  <tupledest>
36                      <sourcedid>
37                          <source>IMS_LIP_V1p0_Example</source>
38                          <id>1001</id>
39                      </sourcedid>
40                      <indexid>transcript_01</indexid>
41                  </tupledest>
42              </tuple>
43          </relationship>
44      </learnerinformation>
```

Appendix A - LIP DTD (Uncommented)

```
<!ENTITY % lang.attr " xml:lang CDATA  'en'">

<!ENTITY % uri.attr " uri CDATA  #IMPLIED">

<!ENTITY % profmode.attr " profmode  (Write | Read | OralSpeak | OralComp )  #REQUIRED">

<!ENTITY % entityref.attr " entityref ENTITY  #IMPLIED">

<!ENTITY % source.attr "source (text | uri | entityref | uid ) #REQUIRED">

<!ELEMENT comment  (#PCDATA )>
<!ATTLIST comment  %lang.attr;
                   e-dtype   NMTOKEN  #FIXED 'string' >

<!ELEMENT priority  (#PCDATA )>
<!ATTLIST priority  %lang.attr;
                    e-dtype   NMTOKEN  #FIXED 'string' >

<!ELEMENT source  (#PCDATA )>
<!ATTLIST source  e-dtype NMTOKEN  #FIXED 'string' >

<!ELEMENT id  (#PCDATA )>
<!ATTLIST id  e-dtype NMTOKEN  #FIXED 'string' >

<!ELEMENT short  (#PCDATA )>
<!ATTLIST short  %lang.attr;
                 e-dtype   NMTOKEN  #FIXED 'string' >

<!ELEMENT long  (#PCDATA )>
<!ATTLIST long  %lang.attr;
                e-dtype   NMTOKEN  #FIXED 'string' >

<!ELEMENT fielddata  (#PCDATA )>
<!ATTLIST fielddata  e-dtype NMTOKEN  #FIXED 'string' >

<!ELEMENT proficiency  (#PCDATA )>
<!ATTLIST proficiency  %lang.attr;
                       %profmode.attr;
                       e-dtype       NMTOKEN  #FIXED 'string' >

<!ELEMENT pobox  (#PCDATA )>
<!ATTLIST pobox  %lang.attr;
                 e-dtype   NMTOKEN  #FIXED 'string' >

<!ELEMENT locality  (#PCDATA )>
<!ATTLIST locality  %lang.attr;
                    e-dtype   NMTOKEN  #FIXED 'string' >

<!ELEMENT city  (#PCDATA )>
<!ATTLIST city  %lang.attr;
                e-dtype   NMTOKEN  #FIXED 'string' >

<!ELEMENT country  (#PCDATA )>
<!ATTLIST country  %lang.attr;
                   e-dtype   NMTOKEN  #FIXED 'string' >
<!ELEMENT statepr  (#PCDATA )>
<!ATTLIST statepr  %lang.attr;
                   e-dtype   NMTOKEN  #FIXED 'string' >

<!ELEMENT region  (#PCDATA )>
<!ATTLIST region  %lang.attr;
                  e-dtype   NMTOKEN  #FIXED 'string' >

<!ELEMENT postcode  (#PCDATA )>
<!ATTLIST postcode  %lang.attr;
                    e-dtype   NMTOKEN  #FIXED 'string' >
```

```
<!ELEMENT timezone  (#PCDATA )>
<!ATTLIST timezone  %lang.attr;
                    e-dtype   NMTOKEN  #FIXED 'time.tz' >

<!ELEMENT nonfieldedstreetaddress  (#PCDATA )>
<!ATTLIST nonfieldedstreetaddress  %lang.attr;
                                   e-dtype   NMTOKEN  #FIXED 'string' >

<!ELEMENT complex  (#PCDATA )>
<!ATTLIST complex  %lang.attr;
                   e-dtype   NMTOKEN  #FIXED 'string' >

<!ELEMENT streetnumber  (#PCDATA )>
<!ATTLIST streetnumber  %lang.attr;
                        e-dtype   NMTOKEN  #FIXED 'string' >

<!ELEMENT streetprefix  (#PCDATA )>
<!ATTLIST streetprefix  %lang.attr;
                        e-dtype   NMTOKEN  #FIXED 'string' >

<!ELEMENT streetname  (#PCDATA )>
<!ATTLIST streetname  %lang.attr;
                      e-dtype   NMTOKEN  #FIXED 'string' >

<!ELEMENT streetype  (#PCDATA )>
<!ATTLIST streetype  %lang.attr;
                     e-dtype   NMTOKEN  #FIXED 'string' >

<!ELEMENT streetsuffix  (#PCDATA )>
<!ATTLIST streetsuffix  %lang.attr;
                        e-dtype   NMTOKEN  #FIXED 'string' >

<!ELEMENT apttype  (#PCDATA )>
<!ATTLIST apttype  %lang.attr;
                   e-dtype   NMTOKEN  #FIXED 'string' >

<!ELEMENT aptnumprefix  (#PCDATA )>
<!ATTLIST aptnumprefix  %lang.attr;
                        e-dtype   NMTOKEN  #FIXED 'string' >

<!ELEMENT aptnumber  (#PCDATA )>
<!ATTLIST aptnumber  %lang.attr;
                     e-dtype   NMTOKEN  #FIXED 'string' >

<!ELEMENT aptnumsuffix  (#PCDATA )>
<!ATTLIST aptnumsuffix  %lang.attr;
                        e-dtype   NMTOKEN  #FIXED 'string' >

<!ELEMENT countrycode  (#PCDATA )>
<!ATTLIST countrycode  e-dtype NMTOKEN  #FIXED 'int' >

<!ELEMENT indnumber  (#PCDATA )>
<!ATTLIST indnumber  e-dtype NMTOKEN  #FIXED 'int' >

<!ELEMENT extnumber  (#PCDATA )>
<!ATTLIST extnumber  e-dtype NMTOKEN  #FIXED 'int' >

<!ELEMENT placeofbirth  (#PCDATA )>
<!ATTLIST placeofbirth  %lang.attr;
                        e-dtype   NMTOKEN  #FIXED 'string' >

<!ELEMENT datetime  (#PCDATA )>
<!ATTLIST datetime  e-dtype NMTOKEN  #FIXED 'dateTime' >

<!ELEMENT text  (#PCDATA )>
<!ATTLIST text  %uri.attr;
                %entityref.attr;
                %lang.attr;
                e-dtype   NMTOKEN  #FIXED 'string' >
```

```
<!ELEMENT title  (#PCDATA )>
<!ATTLIST title  %lang.attr;
                 e-dtype   NMTOKEN  #FIXED 'string' >

<!ELEMENT prefcode  (#PCDATA )>
<!ATTLIST prefcode  %lang.attr;
                    e-dtype   NMTOKEN  #FIXED 'string' >

<!ELEMENT registrationno  (#PCDATA )>
<!ATTLIST registrationno  e-dtype NMTOKEN  #FIXED 'string' >

<!ELEMENT areacode  (#PCDATA )>
<!ATTLIST areacode  e-dtype NMTOKEN  #FIXED 'int' >

<!ELEMENT gender EMPTY>
<!ATTLIST gender  gender  (M | F | NA )  #REQUIRED >

<!ELEMENT learnerinformation  (comment? , contentype? ,  (identification | goal | qcl | activity
| competency | transcript | accessibility | interest | affiliation | securitykey | relationship |
ext_learnerinfo )* )>
<!ATTLIST learnerinformation  %lang.attr; >

<!ELEMENT fieldlabel  (typename )>

<!ELEMENT sourcedid  (source , id )>

<!ELEMENT identification  (comment? , contentype? ,  (formname | name | address | contactinfo |
demographics | agent )* , ext_identification? )>

<!ELEMENT preference  (typename? , comment? , contentype? , prefcode? , description? ,
ext_preference? )>

<!ELEMENT goal  (typename? , comment? , contentype? , date* , priority? , status? , description?
, goal* , ext_goal? )>

<!ELEMENT qcl  (typename? , comment? , contentype? , title? , organization? , registrationno? ,
level? , date* , description? , ext_qcl? )>

<!ELEMENT activity  (typename? , comment?, contentype?, date*, status?, units?,
(learningactivityref | definition | product | testimonial | evaluation )* ,description? ,
activity* , ext_activity? )>

<!ELEMENT competency (comment?, contentype?, exrefrecord?, description?, ext_competency? )>

<!ELEMENT interest  (typename?, comment?, contentype?, product?, description?,
ext_interest? )>

<!ELEMENT affiliation  (typename?, comment?, contentype?, classification?, affiliationid?, role*
, organization? , date* , status? , description? , affiliation* , ext_affiliation? )>

<!ELEMENT classification  (#PCDATA )>
<!ATTLIST classification  %lang.attr;
                         e-dtype   NMTOKEN  #FIXED 'string' >

<!ELEMENT name  (typename? , comment? , contentype? , partname* )>

<!ELEMENT address  (typename?, comment?, contentype?, pobox?, street?, locality?, city?,
statepr?, region?, country?, postcode?, timezone?, geo? )>

<!ELEMENT contactinfo  (typename? , comment? , contentype? ,  (telephone | facsimile | mobile |
pager | email | web ) )>

<!ELEMENT demographics  (typename? , comment? , contentype? , representation* , gender? , date? ,
placeofbirth? , uid? )>

<!ELEMENT language  (typename? , comment? , contentype? , proficiency* , ext_language? )>

<!ELEMENT disability  (typename? , comment? , contentype? , ext_disability? )>

<!ELEMENT securitykey  (typename? , comment? , contentype? , keyfields* , description? ,
ext_securitykey? )>
```

```
<!ELEMENT description  (short | long | full )+>

<!ELEMENT full  (comment? , media+ )>

<!ELEMENT contentype  (comment? ,  (referential | temporal | privacy )+ , ext_contentype? )>

<!ELEMENT referential  (sourcedid | indexid |  (sourcedid , indexid ) )>

<!ELEMENT temporal  (typename? , temporalfield+ )>

<!ELEMENT privacy  (typename? , privacyfield+ , date* )>

<!ELEMENT indexid  (#PCDATA )>
<!ATTLIST indexid  e-dtype NMTOKEN  #FIXED 'string' >

<!ELEMENT status  (typename? , date? , description? )>

<!ELEMENT partname  (typename? , text? )>

<!ELEMENT street  (nonfieldedstreetaddress?, complex?, streetnumber?, streetprefix?, streetname?,
streetype?, streetsuffix?, apttype?, aptnumprefix?, aptnumber?, aptnumsuffix? )>

<!ELEMENT telephone  (countrycode? , areacode , indnumber , extnumber? )>

<!ELEMENT email  (#PCDATA )>
<!ATTLIST email  e-dtype NMTOKEN  #FIXED 'string' >

<!ELEMENT web  (#PCDATA )>
<!ATTLIST web  e-dtype NMTOKEN  #FIXED 'string' >

<!ELEMENT representation  (typename? , date* , description* )>

<!ELEMENT date  (typename? , datetime , description? , ext_date? )>

<!ELEMENT organization  (typename? , description? )>

<!ELEMENT level  (text , level? )>

<!ELEMENT exrefrecord  (comment? , recformat , recdata , date* , description? , ext_exrefrecord?
)>

<!ELEMENT role (typename?, comment?, contentype?, date*, status?, description?, role*, ext_role?
)>

<!ELEMENT evaluation  (typename? , comment? , contentype? , evaluationid? , date* , evalmetadata?
, objectives* , status? , noofattempts? , duration* , result* , description? , evaluation* ,
ext_evaluation? )>

<!ELEMENT testimonial  (typename? , comment? , contentype? , date* , description? ,
ext_testimonial? )>

<!ELEMENT definition  (typename? , comment? , contentype? , definitionfield* , description? ,
definition* , ext_definition? )>

<!ELEMENT evalmetadata  (typename? , evalmetadatafield+ )>

<!ELEMENT evalmetadatafield  (fieldlabel , fielddata )>
<!ATTLIST evalmetadatafield  %lang.attr; >

<!ELEMENT objectives  (comment? ,  (media | contentref )+ , ext_objectives? )>
<!ATTLIST objectives  view  (All | Administrator | AdminAuthority | Assessor | Author | Candidate
| InvigilatorProctor | Psychometrician | Scorer | Tutor )  'All' >

<!ELEMENT result  (comment? ,  ( (interpretscore | score )* | result* ) )>

<!ELEMENT product  (typename?, comment?, contentype?, date?, description?, ext_product? )>

<!ELEMENT units  (unitsfield+ )>
```

```
<!ELEMENT accessibility  (comment? , contentype? ,  (language | eligibility | preference |
disability )+ , ext_accessibility? )>

<!ELEMENT eligibility  (typename? , comment? , contentype? , ext_eligibility? )>

<!ELEMENT formname  (typename? , comment? , contentype? , text? )>

<!ELEMENT uid  (#PCDATA )>
<!ATTLIST uid  e-dtype NMTOKEN  #FIXED 'string' >

<!ELEMENT agent  (typename?, comment?, contentype?, agentid, agentdomain, description? )>

<!ELEMENT agentdomain  (typename? )>

<!ELEMENT typename  (tysource? , tyvalue )>

<!ELEMENT recformat ANY>
<!ATTLIST recformat  %uri.attr;
                     %entityref.attr; >

<!ELEMENT recdata ANY>
<!ATTLIST recdata  %uri.attr;
                   %entityref.attr; >

<!ELEMENT transcript  (typename? , comment? , contentype? , exrefrecord? , description? ,
ext_transcript? )>

<!ELEMENT affiliationid  (#PCDATA )>
<!ATTLIST affiliationid  e-dtype NMTOKEN  #FIXED 'string' >

<!ELEMENT learningactivityref  (sourcedid | text )+>

<!ELEMENT relationship  (typename?, comment?, contentype?, tuple?, description?,
ext_relationship? )>

<!ELEMENT geo  (lat , lon )>

<!ELEMENT lat  (#PCDATA )>
<!ATTLIST lat  e-dtype NMTOKEN  #FIXED 'string' >

<!ELEMENT lon  (#PCDATA )>
<!ATTLIST lon  e-dtype NMTOKEN  #FIXED 'string' >

<!ELEMENT evaluationid  (#PCDATA )>
<!ATTLIST evaluationid  e-dtype NMTOKEN  #FIXED 'ID' >

<!ELEMENT noofattempts  (#PCDATA )>
<!ATTLIST noofattempts  e-dtype NMTOKEN  #FIXED 'int' >

<!ELEMENT duration  (fieldlabel , fielddata )>

<!ELEMENT tuple  (tuplesource , tuplerelation , tupledest+ )>

<!ELEMENT tuplesource  (sourcedid? , indexid )>

<!ELEMENT tuplerelation  (typename , text? )>

<!ELEMENT tupledest  (sourcedid? , indexid )>

<!ELEMENT contentref  (#PCDATA )>
<!ATTLIST contentref  e-dtype NMTOKEN  #FIXED 'ID' >

<!ELEMENT media  (#PCDATA )>
<!ATTLIST media  mediamode  (Text | Image | Video | Audio | Applet | Application )  #REQUIRED
                 contentreftype  (uri | entityref | Base-64 )  'Base-64'
                 mimetype       CDATA  #REQUIRED >

<!ELEMENT tysource  (#PCDATA )>
<!ATTLIST tysource  sourcetype  (imsdefault | list | proprietary | standard )  'imsdefault'
                    e-dtype    NMTOKEN  #FIXED 'string' >
```

```
<!ELEMENT tyvalue  (#PCDATA )>
<!ATTLIST tyvalue  %lang.attr;
                   e-dtype   NMTOKEN  #FIXED 'string' >

<!ELEMENT agentid  (#PCDATA )>
<!ATTLIST agentid  e-dtype NMTOKEN  #FIXED 'string' >

<!ELEMENT interpretscore  (fieldlabel , fielddata )>

<!ELEMENT score  (fieldlabel , fielddata )>

<!ELEMENT facsimile  (countrycode? , areacode , indnumber , extnumber? )>

<!ELEMENT pager  (countrycode? , areacode , indnumber )>

<!ELEMENT mobile  (countrycode? , areacode , indnumber )>

<!ELEMENT temporalfield  (fieldlabel , fielddata )>

<!ELEMENT privacyfield  (fieldlabel , fielddata )>

<!ELEMENT definitionfield  (fieldlabel , fielddata )>

<!ELEMENT unitsfield  (fieldlabel , fielddata )>

<!ELEMENT keyfields  (fieldlabel , fielddata )>

<!ELEMENT ext_accessibility ANY>

<!ELEMENT ext_goal ANY>

<!ELEMENT ext_interest ANY>

<!ELEMENT ext_evaluation ANY>

<!ELEMENT ext_learnerinfo ANY>

<!ELEMENT ext_contentype ANY>

<!ELEMENT ext_activity ANY>

<!ELEMENT ext_affiliation ANY>

<!ELEMENT ext_competency ANY>

<!ELEMENT ext_date ANY>

<!ELEMENT ext_definition ANY>

<!ELEMENT ext_disability ANY>

<!ELEMENT ext_eligibility ANY>

<!ELEMENT ext_exrefrecord ANY>

<!ELEMENT ext_identification ANY>

<!ELEMENT ext_language ANY>

<!ELEMENT ext_objectives ANY>

<!ELEMENT ext_preference ANY>

<!ELEMENT ext_product ANY>

<!ELEMENT ext_qcl ANY>

<!ELEMENT ext_relationship ANY>

<!ELEMENT ext_role ANY>
```

```
<!ELEMENT ext_securitykey ANY>

<!ELEMENT ext_testimonial ANY>

<!ELEMENT ext_transcript ANY>
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