Differences and Similarities of Micro-content and Structured Content (Including Terminologies and Other Language and Content Resources)

BLANCA STELLA GIRALDO PEREZ
Center of Translation Studies, University of Vienna

CHRISTIAN GALINSKI
International Information Centre for Terminology (Infoterm)

KEYWORDS: eContent, content interoperability, lexical semantics, structured content, micro-content, terminology and other language and content resources (TLCR), factual knowledge, micro learning objects (MLO), terminological data, lexicographical data

1. THE CONCEPT OF eCONTENT

Previous contributions have shown that the concept of content – here in the meaning of *digital content* generally referred to as 'eContent' – is subject to an array of interpretations depending on different purposes following diverging interests. As there are many kinds of eContent, there consequently are several kinds of content management systems (CMS):

> "In reality, a CMS is a concept rather than a product. It is a concept that embraces a set of processes. Institutional needs are often highly individual (reflecting the heterogeneity of their processes and back-end information systems) ...Moreover, the boundaries of the CMS space are blurred. Substantial overlaps exist with document management systems, knowledge management systems, enterprise application integration systems, e-commerce systems and portals. We also contend that there are significant (but as yet not generally recognized) overlaps with intranet groupware and virtual learning environments. Indeed, it may turn out that one institution's 'managed learning environment' is another's CMS." (Browning & Lowndes 2001: 2)

The above hints at an overlap of some CMS with 'managed learning environments', which indirectly indicates a connection between content and learning resources.

eContent started off from having textual data in mind. Soon not only the existence of many languages (and scripts) was recognized, but soon

eContent had to be further extended to cover other kinds of language resources and non-linguistic data, such as graphical data, audio and audio-visual data and ultimately multimedia data. Increasingly these quite different kinds of data (from the content management point of view) are occurring in combined form or interlinked with each other which necessitated new approaches to enable *content integration* and *content interoperability*. Besides, content management from a theoretic-methodological point of view usually does not clearly distinguish between:

- content on the one hand and data – information – knowledge on the other hand[1],
- large and small entities of content (and the respective content resources),
- structured and unstructured content.

This often proves to be a big barrier against the integratability and interoperability of content as increasingly required in more and more eApplications today (Giraldo & Galinski 2014).

This contribution investigates a range of different kinds of small entities of structured content and their role in a variety of applications, analysed in relation to *micro-content*.

2. CONTENT INTEROPERABILITY

As mentioned above, the early concepts of eContent did not differentiate between various kinds of content, neither between large content items – such as whole databases – and any component of them. Soon multilingual data (incl. different scripts) became a necessity in several fields of applications, such as in product and software localization. Globalization stimulated the development of 'internationalization' approaches to facilitate localization. This required a higher degree of content structuring for which various approaches were developed – increasingly with the aim to cope with 'semantics'. Since around 1980 attempts started to standardize the semantic structuring of small *digital objects*[2] of content – especially those recorded and maintained in databases. Later also other kinds of content – also presented in a broader range of modalities – were processed in

---

[1] In general one can say that from the user's perspective, information is all content, while from the computer programmer's perspective, it is all data. (Boiko 2004: 5)

[2] 'Digital objects' are also called items, units, records, documents, etc. – in this contribution the neutral term 'entity' will be used.

databases and the emergence of mobile devices is further pushing the implementation of enhanced modalities, among others also for helping people with disabilities (PwD) in eAccessibility and eInclusion (Galinski & Beckmann 2012). Needless to say this development makes interoperability in all its facets more and more important.

Therefore, the "Recommendation on software and content development principles 2010" defines as basic requirements for semantic interoperability the fitness for:

- multilinguality (covering also cultural diversity),
- multimodality and multimedia,
- eAccessibility and eInclusion,
- multi-channel presentations.

They should be considered at the earliest stage of the software design process, and data modelling (including the definition of metadata), and here after throughout all the iterative development cycles (MoU/MG 2012). This Recommendation inevitably requires a higher degree of structural complexity, which has to be coped with by a higher degree of data granularity of the data models.

The European Interoperability Framework (EIF – referring to pan-European eGovernment services) defines interoperability as "the ability of communication technology (ICT) systems and of the business processes they support to exchange data and enable sharing of information and knowledge" (IDABC EIF 2004: 5). This definition is biased towards technical interoperability, while falling short with respect to content interoperability. It is, however, indicating the complexity of 'interoperability' by identifying technical, organizational and semantic interoperability, to which at decision making level could be added political interoperability (between countries or regions) and strategic interoperability (within or between organizations) (Galinski 2008).

Content interoperability is going a step further than technical content integration and semantic interoperability by covering (in the meaning of inter-human communication) syntactic, conceptual and pragmatic interoperability. Thus content interoperability refers to data and data structures in integrated (and nevertheless possibly heterogeneous) systems – but even more so to distributed (and possibly heterogeneous) content repositories under the fundamental requirements of content management, namely 'single sourcing', and 'resource sharing'. Single source or single

Blanca Stella Giraldo Perez, Christian Galinski | *Differences and Similarities of Micro-content and Structured Content (Including Terminologies and Other Language and Content Resources)*

sourcing (derived from single source publishing) allows the same content item – stored and maintained only once – to be used in different documents or in various formats for all kinds of applications, while resource sharing enables users and creators of content entitiesto avoid duplication of work through collaborative processes. Thus content interoperability not only responds to today's requirements of mobility/ubiquity as well as distributed and federated content resources, but also is a prerequisite for a high performance of the respective technologies. Content interoperability does not only comprise a high degree of content integratability and re-usability, but should also make content highly re-purposable, e.g. for eLearning purposes. From a technical point-of-view, data processing techniques, (technically speaking) syntax and semantics of content require (especially software related) technical methodology standards. From the point-of-view of inter-human communication, content interoperability requires methodology standards not only for all kinds of content, but also for:

- distributed (web-based) workflow management,
- content quality management,
- content item identification,
- copyright (incl. exploitation rights) management,
- metadata repository design and maintenance,
- generic data modelling principles and requirements,
- metamodels also for metadata repositories,
- federation methods and techniques, etc.

In the following paragraphs, eContent will be analysed from the point of view of different kinds of structured content, including *terminology and other language and content resources (TLCR)* regarded as *structured content at the level of lexical semantics*.

3. LEXICAL SEMANTICS AND TLCR

Dictionary.com's 21st Century Lexicon (2003-2014) defines *lexical semantics* as "the study of the meaning of words and phrases and the relationships between them, such as synonymy, antonymy, and hyponymy". (Barker & Chris 2001: 1) states "The main reason why word-level semantics is especially interesting from a cognitive point of view is that words are names for individual concepts". According to (Baldwin 1998: 7) "Lexical semantics overlaps crucially with fields such as:

- lexicography,
- phraseology,
- philosophy,
- corpus linguistics,
- syntax,
- pragmatics,
- child language acquisition".

Baldwin (1998) is subsuming terminological entities under lexicography.

The semantic entities in the literature on lexical semantics can be represented by lexical entities ranging from morphemes via words, compounds, phrases up to collocations, and also cover relationships between them. Needless to say that the concepts represented by lexical entities and the relations between them need explanation to become explicit. A look into common language dictionaries and other works of reference proves that lexical entities are often supplemented or exemplified by non-verbal representations – especially if a concrete object or a class of concrete objects is referred to.

Terminology theory and methods deal with scientific-technical concepts represented in specialized communication primarily by designations, including morphemes (if significant) and terms (including multi-word terms). Terminological phraseology is also taken into account as terminological entities in co-text (revealing communicative conventions of the respective domain or subject), or as designation in the guise of a terminological phraseme. Terminological methodology in specialized communication not least for the sake of disambiguation and consistency (among others, to avoid legal liability and other issues) sets stricter requirements on the recording of concept descriptions, such as definitions, defining contexts, etc. Due to the nature of texts in specialized communication non-verbal representations are quite common in many domains/subjects and are often as autonomous as verbal representations. This applies both
- to non-verbal designative representations, such as graphical and other non-verbal symbols;
- to non-verbal descriptive representations, such as elements of technical drawings, complex formulas, etc.

In this context it may be of interest that in traffic sign design the elements of traffic signs are called 'morphemes', while the traffic signs are

14   Blanca Stella Giraldo Perez, *Differences and Similarities of Micro-content*
      Christian Galinski   *and Structured Content (Including Terminologies*
                                and Other Language and Content Resources)

called 'concepts'. On the roads two or more traffic signs can be combined to represent a meaning which can be explained in the form of warnings, information, prohibitions or restrictions, etc. Colour and shape of the traffic signs are of high semantic significance! (Galinski 2011)

The above shows that the phenomena with respect to lexical and terminological entities – both representing concepts – are quite parallel. Only the focus, here common language communication, there specialized communication is different. However,

- according to modern brain research, human thinking constantly switches between general concepts and domain/subject-specific concepts, which can be regarded as one of the main mechanisms of knowledge development;
- researchers in the field of language for specific purposes (LSP) times and again assess that there is no sharp border between texts in common language communication vs. texts in specialized communication. (Arntz, Picht & Schmitz 2014: part 2.2)

Depending on the purpose and social context of the communication, the communicative content of the communication will contain more common language lexical entities or more terminological entities for specialized communication. Besides, there are

- processes of 'de-terminologization' which turn terminological entities into common language lexical entities;
- processes of 'terminologization' re-using common language lexical entities for highly domain/subject-specific terminological entities.

Therefore, it suggested itself that the international technical committee ISO/TC 37 "Terminology and other language and content resources" decided on this lengthy title in 2005 extending its scope to read: "Standardization of principles, methods and applications relating to terminology and other language and content resources in the contexts of multilingual communication and cultural diversity."[3]

In the light of the above considerations, TLCR cover entities at the level of lexical semantics.

---

[3] See: http://www.iso.org/iso/home/standards_development/list_of_iso_technical_committees/iso_technical_committee.htm?commid=48104

4. STRUCTURED CONTENT AND MICRO-CONTENT

Similar to the interchangeable use of content – data – information one finds the terms 'structured content', 'structured data' and 'structured information' used more or less interchangeably, as can be gathered from the following citation:

> "Structured data can be defined as the data that resides in fixed fields within a record or file. Relational databases and spreadsheets are examples of structured data." (PC.COM)/Apparently, the opposite, namely 'unstructured data' is/
> "data that does not reside in fixed locations. ... A huge amount of company information is unstructured text." (PC.COM)

From such explanations Giraldo & Galinski (2014) drew the conclusion that TLCR is structured content at the level of lexical semantics, too.

In this connection a paradox has been pointed out referring to the fact that a high degree of structural complexity in the form of higher granularity represented by more (incl. more different kinds of) metadata in fact reduces complexity from the point of view of information processing:

> "Highly structured knowledge bases permit a low degree of complexity to be managed by the information system. In contrast the degree of complexity is very high in weakly structured knowledge bases, where by the user does only need a small amount of information about the meta-structure." (Zumpe & Esswein 2002: 246)

Small or smallest entities of content are increasingly referred to as *micro-content*. According to Leene (2006) micro-content as such is not new; it has been around since centuries. The term micro-content emerged in conjunction with the development of databases and later web-based communication.

> "Originally Jakob Nielsen (1998) referred to microcontent as small groups of words that can be skimmed by a person to get a clear idea of the content of a Web page. He included article headlines, page titles, subject lines and e-mail headings. Such phrases also may be taken out of context and displayed on a directory, search result page, bookmark list, etc."[4]

Another use of the term (also called *microformat*[5]) extends toward other small information chunks that can stand alone or be used in a variety of contexts, including instant messages, blog posts, RSS feeds, and abstracts.

---

[4] See: http://en.wikipedia.org/wiki/Microcontent#cite_note-1

[5] See: http://en.wikipedia.org/wiki/Microformat)

Blanca Stella Giraldo Perez, Christian Galinski | *Differences and Similarities of Micro-content and Structured Content (Including Terminologies and Other Language and Content Resources)*

In any case, things have changed dramatically since Anil Dash (2002: 246[6]) defined 'microcontent':

> "Today, microcontent is being used as a more general term indicating content that conveys one primary idea or concept, is accessible through a single definitive URL or permalink, and is appropriately written and formatted for presentation in email clients, web browsers, or on handheld devices as needed. A day's weather forecast, the arrival and departure times for an airplane flight, an abstract from a long publication, or a single instant message can all be examples of microcontent."

Other sources[7] include characteristics of micro-content which here are compared to terminological data in the following table:

Micro-content:	Compared to terminological data:
generic term for an addressable structured indivisible self-contained piece of digital information *(usually monolingual)*	→ *representation of a concept by means of a terminological record usually with data in more than one language*
self-contained piece of information which can stand on its own, i.e. there is no need for context since all the meaning is contained in itself *(this characteristic does not apply to many kinds of micro-content entities)*	→ *this may apply to one language section of an individual terminological record of low complexity or to the whole terminological record, if concept relations are neglected*
indivisible piece of information which can no longer be cut into smaller useful pieces *(this characteristic does not apply to many kinds of micro-content entities)*	→ *this may apply to an individual language section of a terminological record*
structured in the sense that it does not consist of a single blob of information, but has structure	→ *this also applies to most TLCR*
'external structure' consists of metadata	→ *data categories are used in terminology management*
addressable in the sense that it is addressable on the Internet which implies that it has a permalink	→ *this applies to the unique identifier of each terminological record (as well as to many other kinds of records) which could – if web-based – be retrieved through a permalink*

---

[6] See: http://dashes.com/anil/2002/11/introducing-microcontent-client.html

[7] See: http://www.sivas.com/microcontent/articles/definition/definition.html

Micro-content:	Compared to terminological data:
not necessarily small, as it may in fact be very large in terms of megabytes	→ *more often than not this also applies to TLCR, especially if non-verbal representations are comprised*
flexible in the sense that it is possible to add new fields and thus enhance the structure of an item	→ *this can (and increasingly should) also apply to many TLCR*
relations between items might exist *(this conflicts with the characteristic 'self-contained')*	→ *this also applies to terminological records*
items should be owned by their authors who should be able to change or delete an item	→ *this increasingly also applies to TLCR developed and maintained under web-based and cooperative approaches*
allows for re-use of an item which can also be called mashup	→ *this may – however, in a different way, as it needs stricter control in terminology – also be applied to TLCR*
needs a 'container' in order to be exchanged and re-used for which a 'format' is needed	→ *this also applies to records of TLCR*

Formally speaking the metadata, too, are a kind of micro-content for which again one needs metadata in order to record and maintain them in metadata registries according to the series of international standards ISO 11179.

From the above one can gather that the difference between TLCR and micro-content theoretically is not a fundamental one. While micro-content of the kind used in the Internet is aiming at easily producing, simply re-using and smoothly re-purposing the respective content, TLCR have evolved with the aim to satisfy minimum requirements to data quality, data stability and sustainability. Besides, in the field of terminology management the multilingual approach was prevailing from the beginning.

Judging from the above, TLCR could be used without great difficultyin the form of micro-content in the Internet.

5. MICRO-CONTENT AND TLCR

At a general level there are examples (see among others Leene 2006) of micro-content types, such as:

Blanca Stella Giraldo Perez, Christian Galinski | *Differences and Similarities of Micro-content and Structured Content (Including Terminologies and Other Language and Content Resources)*

- address cards (the electronic equivalent of a business card) which can have multiple fields,
- recipes (it has tags, such as key words, and pictures – micro-content item that adds complexity),
- images,
- audio files,
- blog items (considered one of the main micro-content types).

There are many sources where micro-content can be taken from, such as[8]:
- highly formalized weather forecasts (e.g. Accuweather),
- deal of the day,
- photographs,
- micro-videos (e.g. Instagram format),
- curated content.

Other examples of micro-content types that can be easily created are[9]:
- tips,
- how-tos,
- quotes,
- check lists,
- infographics.

The following text may provide a clue to understand the difference – however, probably not fundamental difference – between TLCR and micro-content:

> "There are many more or less familiar concepts that can be expressed by language but for which there is no corresponding word. There is no single word in English that specifically names the smell of a peach, or the region of soft skin on the underside of the forearm, though presumably there could be. Furthermore, it is common for one language to choose to lexicalize a slightly different set of concepts than another." (Barker & Chris 2001: 1)

From the above one can deduce among others that
- there are potentially too many material or immaterial objects in the universe, whose concepts may need a name (i.e. a lexical entity or a TLCR record);

---

[8] See: http://heidicohen.com/4-micro-content-marketing-ideas-you-can-steal/

[9] See: http://www.sivas.com/microcontent/articles/definition/definition.html

- the naming of concepts – especially in common language – may differ from language to language (and their respective cultures), not to mention given purposes, etc.;
- some micro-content refers to facts rather than classified knowledge – e.g. fast changing information items in weather forecast (which does not preclude that classified knowledge items are used to construct the facts).

Some kinds of micro-content resemble factual data in the meaning of 'verifiable facts' (which – in commercial environments – can reasonably be assumed to contribute to investigation, understanding, and solution of the problem at hand[10]) or factual information (being a type of information that quotes real things that are occurring). The latter does not require further information when being delivered to anybody. A terminological entry can be seen as a container of certain factual data on concepts and their representations. Adding or combining data seems to increase the semantic richness of information both in micro-content and in TLCR.

Here again one can observe the interchangeable use of data and information. With respect to *factual knowledge*, however, a somehow related discourse has developed in the field of eLearning which could have an impact on the discussion about micro-content.

6. MICRO-CONTENT AND FACTUAL KNOWLEDGE

It has long been recognized that there are different kinds of knowledge. Various disciplines classify or categorize knowledge in different ways – for instance in connection with Bloom's taxonomy of educational objectives (revised)[11]:

Type of Knowledge	Examples
Factual Knowledge The basic elements students must know to be acquainted with a discipline or solve problems in it	Technical vocabulary; musical symbols; major natural resources; reliable sources of information; works by an artist; historical events

[10] See: http://www.businessdictionary.com/definition/factual-data.html#ixzz33J0vSCEK

[11] In education http://cte.illinois.edu/resources/topics/syllabus/blooms.html

Blanca Stella Giraldo Perez, Christian Galinski | *Differences and Similarities of Micro-content and Structured Content (Including Terminologies and Other Language and Content Resources)*

Type of Knowledge	Examples
Conceptual Knowledge The interrelationship among the basic elements within a larger structure that enables them to function together	Syntax classifications; periods of geological time, forms of business ownership; Pythagorean theorem; fundamental laws of physics; theory of evolution; theory of plate tectonics; genetic models; models of government
Procedural Knowledge How to do something, methods of inquiry, and criteria for using skills, algorithms, techniques, and methods	Skills used to paint a watercolour; skills used to determine a sport's injury; algorithms for solving quadratic equations; methods of literary criticism; the scientific method; criteria for determining which statistical procedure to use
Metacognitive Knowledge Knowledge of cognition in general as well as awareness and knowledge of one's own cognition	Knowledge of various mnemonic strategies; knowledge of various organizational strategies; knowledge that elaboration strategies such as summarizing and paraphrasing can result in deeper levels of comprehension; knowledge of one's level of knowledge in an area; knowledge of one's motivation for a task

Here factual knowledge refers to the basic elements students must know to be acquainted with a discipline or solve problems in it[12]. Examples include:

- knowledge of terminology: technical vocabulary, musical symbols, etc.;
- knowledge of specific details and elements: major natural resources, reliable sources of information, etc.

Factual knowledge thus seems to comprise first of all TLCR and factual information, both of which can be regarded as micro-content. The examples for factual knowledge could well include all kinds of TLCR, on the one hand, and many different kinds of micro-content, on the other hand. As with TLCR and micro-content at large they may comprise semantically shallow entities and semantically rich entities.

In this connection, lexical entities are important for understanding and communicating any kind of micro-content at a basic level. Technical vocabulary (i.e. terminological entities) is fundamental for understanding the subject matter of a domain and in order to be able to communicate among experts. In addition, terminologies have another important function:

---

[12] See: http://oregonstate.edu/instruct/coursedev/models/id/taxonomy/factual.htm

as terminological entities are based on concept classification (Wüster 1971), they are indispensable for ordering knowledge and for more deeply understanding knowledge – not to mention forusing it correctly in specialized communication.

Many kinds of micro-content consist of volatile factual knowledge not necessarily geared towards being recorded and maintained for longer periods of time. Some can be constructed on the fly in response to a user's request – more and more even automatically created by ICT systems. Many of these are highly purpose-oriented or purpose-dependent. Their 'value' lies in the societal or even commercial exploitability. Increasingly micro-content offered on the Web is multilingual (or is automatically translated into other languages).

The value of other kinds of micro-content, such as terminology, relies on their quality, reliability and sustainability. Over many years of incremental development of terminology theory and methodology, data models which can cope with the internal complexity of a terminological recordwere developed (including the requirements of multilinguality and multimodality for many applications).

All kinds of micro-content are or could become important first of all at a basic knowledge acquisition level in the field of education. Judging from the above, TLRC and factual information/knowledge can be considered (or used as) micro-content and all can be taken as structured content at the level of lexical semantics. In this connection the closely related discourse on *micro learning objects* is also of relevance.

7. MICRO-CONTENT AND MICRO LEARNING OBJECTS (MLO)

Job & Ogalo (2012: 92) observed:

> "Micro learning emerges from micro content. Micro content is little bits of digital information in a permanent state of flux and circulation. It is often a single topic, limited in length, consumed quickly, and often limited by software or device. It is the sharing of resources. It relies on human-to-human interaction and interaction with Internet media. Micro learning takes on an active role in the filtering and the supply of information. With the help of the knowledge about the learning context of the user, micro learning can offer and initiate interesting information. Current technological, economic and social changes trigger the need for new concepts and strategies to support lifelong learning."

Blanca Stella Giraldo Perez, Christian Galinski | *Differences and Similarities of Micro-content and Structured Content (Including Terminologies and Other Language and Content Resources)*

Years before, Sánchez-Alonso et al. (2006: 296) stated about micro-learning:

> "The concept of '/micro/[13] learning object' (McGreal, 2005) has become widespread in the last years as the key structuring concept for learning resources – described by metadata records. In principle, a microcontent piece with educational purpose plus metadata describing both the piece itself and its educational usages may be considered as a regular learning object. However, the microcontent vision entails that those descriptions should come from subjective personal views of the world, e.g. those views offered by blog authors."

They further observed:

> "Microlearning has been considered as a specific pedagogical approach that focuses on the use of microcontents as a special, small and subjective account of the concept of 'learning resource'. In other direction, the learning object paradigm focuses on the reuse of learning resources by means of metadata. At first glance, both approaches may be considered as complementary. However, the micro approach to learning (arguably) emphasizes subjective views, quick creation of information and a degree of casualness. This entails that the creation of metadata should follow the same philosophy, which would eventually result in a specific style or idiom in the creation of learning objects." (Sánchez-Alonso et al. 2006: 296)

Sánchez-Alonso et al. (2006: 302) conclude:

> "Microcontents can be considered as fine granularity learning objects that are created inconcrete environments that have some inherent subjectivity, and that are in many cases informal, not following a strong educational intention. Thus, the practice of creating metadata and using them for search has some specific characteristics."

Implicitly this indicates that on the one hand turning micro-content entities into MLOs – and factual knowledge at large – in a systematic way under the perspective of content interoperability (incl. sustainability issues) may require additional specific metadata to comply with the requirements of micro-pedagogies or micro-didactics. On the other hand MLOs themselves could again be regarded as micro-content. This and the two fields of micro-pedagogies or micro-didactics still need further research.

8. CONCLUSIONS

This contribution investigated closely related concepts with respect to the smallest entities of eContent, such as (semantically) structured content,

---

[13] Added by the authors, because that is what is meant here.

lexical semantics, terminology and other language and content resources (TLCR), micro-content, factual knowledge and micro learning objects (MLO). It shows that several fields of research have developed different terminologies about similar or possibly the same 'digital objects' that can be subsumed under 'structured content at the level of lexical semantics', such as:

- terminology and other language and content resources (TLCR),
- micro-content,
- factual knowledge,
- micro learning objects (MLO).

In any case, lexical semantics is not confined to verbal entities, but can consist of any kind of modality for representing concepts.

There are strong indications for assuming that 'structured content at the level of lexical semantics' is the proper concept to comprise all kinds of micro-content or potential micro-content and that the respective entities of structured content at the level of lexical semantics are either largely overlapping or could converge under certain purposes or applications. There may be in reality even more kinds of such entities not yet identified as such. In any case, virtually all of them can be or could become MLOs depending on the purpose or application. Needless to prove that quite a number of them have already been turned into profitable business on the Internet.

In addition, there are strong indications for assuming that all kinds of structured content do not differ from a fundamental theoretical point of view. They differ from the point of view of purpose and application usually geared towards a certain audience which has an impact on approach and methodology. But it looks as if the difference in approaches and methodologies is less due to the nature of the micro-content in question and the purpose in question, but to the system design used to implement a given approach or methodology. It seems as if it is rather software engineering that dictates the details of a multitude of implementation than inherent requirements of the respective content or the requirements necessary for a given purpose.

Virtually all micro-content (including MLOs taken as micro-content entities of higher semantic richness) are based on data modelling approaches using metadata:

> "Consequently, the description, storage and retrieval of 'micro-learning objects' should follow some principles that are in coherence with the concrete creation of context of microcontents. For example, micrometadata would have the

Blanca Stella Giraldo Perez, Christian Galinski | *Differences and Similarities of Micro-content and Structured Content (Including Terminologies and Other Language and Content Resources)*

requirement to be easy to edit – just as blog posts are. Further, microcontent results in a proliferation of micrometadata records to a volume that requires a careful consideration from the technical perspective." (Sánchez-Alonso et al. 2006: 296)

This shows that the harmonization of metadata and their application would be a lever towards implementing a higher degree of content interoperability of this area of eContent which would be particularly beneficial for the efficient creation and application of MLOs in eLearning. Terminology theory and methodology could serve as a best practice in this connection. This is confirmed by Sánchez-Alonso et al.:

"On the technical side, mechanisms for the semantic search, selection and aggregation of microcontents are required if we want to really exploit the benefits of metadata (Koper, 2004). Further, tools for the 'micro-annotation' of microcontents for popular technologies (blogs, Wikis, etc.) should be developed and studied from different perspectives – including human computer interaction. On the conceptual side, the main open problem is how to embed micro-pedagogies or micro-didactics into usable ontologies, so that software tools can be developed to aid humans in the setting of microlearning contexts– ..." (Sánchez-Alonso et al. 2006: 302)

Further investigation is needed
- to analyse the data models and formats (incl. the metadata applied) of different kinds of entities of structured content at the level of lexical semantics – incl. also the aspect of semantically shallow vs. semantically rich entities;
- to examine how the whole field of entities of structured content at the level of lexical semantics can benefit from the multilingual and multimodal approach of terminology management – given the fact that increasingly multilinguality is required from many kinds of micro-content;
- to investigate the possibility of a generic data model for MLOs covering most or all of these entities of structured content at the level of lexical semantics – at least with respect to core metadata necessary for all or most kinds of entities of structured content at the level of lexical semantics to be re-purposed as MLOs.

Sánchez-Alonso et al. (2006: 302) are right when stating: "... but for this, studies on learning theories must come before actual ontology engineering".

REFERENCES

Arntz R., Picht H., Schmitz K.-D. 2014: Fachsprache und Fachwortschatz. – Arntz R., Picht H., Schmitz K.-D. *Einführung in die Terminologieabeit*, Hildesheim: Georg OlmsVerlag, 11-34.

Baldwin T. 1998: ACL/HCSNet Advanced Programme in NLP Lexical Semantics: An Introduction – [viewed 30 January 2014] slide 7. Available from: http://www.pdfe2dg.org/read-360973/#.U4ykovmSx9k

Barker C., Chris B. 2001: Lexical Semantics. – *Encyclopedia of Cognitive Science USA,* Macmillan.Available from: http://semarch.linguistics.fas.nyu.edu/barker/Research/barker-lexical.pdf

Boiko B. 2004: Defining Data, Information, and Content. – *Content Management Bible*, 2nd Edition, Indianapolis: Wiley Publishing Company, 3-12. Available from: http://www.metatorial.com/downloads/ Boiko_Wp_DefiningDataInformationContent.pdf

Browning P., Lowndes M. 2001: Content Management Systems. – *JISC TechWatch Report*, 2. Available from: http://pozi.dsic.upv.es/spw/viejo/content%20management/tsw_01-02.pdf

Dash A. 2002: Introducing the Microcontent Client. Blogged November 13, 2002. Available from: http://dashes.com/anil/2002/11/introducing-microcontent-client.html

Dictionary.com (n.d.).Lexical semantics.WordNet® 3.0 [viewed June 01, 2014]. Available from: http://dictionary.reference.com/browse/lexical semantics

Galinski C. 2008: Content Interoperability of multilingual content resources. – Prys D., Williams B. eds. *Proceedings of the International Conference on Global Understanding in Multilingual and Multimedia Contexts* (GUM3C2008), Bangor: University Bangor, 11-38.

Galinski C. 2011: A Sign equals Thousand Words: Consistency of Traffic/Road Signs and Verbal Messages. – Bekiaris E., Wiethoff M., Gaitanidou E. *Infra-structure and Safety in a Collaborative World: Road Traffic Safety* (1st ed.), Heidelberg, Dordrecht, London, New York: Springer, 263-284.

Galinski C., Beckmann H. 2012: Concepts for Enhancing Content Quality and Accessibility: In General and in the Field of eProcurement – Kajan E., Dorloff F.-D., Bedini I. *Handbook of Research on E-Business Standards and Protocols: Documents, Data and Advanced Web Technologies*, Hershey PA, USA: IGI Global, vol. 1, 84-101.

Giraldo B. S., Galinski C. 2014: Typology of structured content in e-Applications – Under a content interoperability perspective. – Budin G. & Lušicky V. *Languages for Special Purposes in a Multilingual, Transcultural World. Proceedings of the 19th European Symposium on Languages for Special Purposes. 8-9 July 2013*, Vienna: University of Vienna, 405-417.

IDABC EIF 2004: European Interoperability Framework for Pan-European eGovernment Services. – *European Interoperability Framework for Pan-European eGovernment Services*, Belgium: Office for Official Publications of the European Communities. Available from: http://ec.europa.eu/idabc/servlets/Docd552. pdf?id=19529

ISO 1087:2000 Terminology work– Vocabulary – Part 1: Theory and application. Travauxterminologiques – Vocabulaire – Partie 1: Théorieet application

ISO 11179 (series). Information technology – Metadata registries (MDR)

Job M. A., Ogalo H. S. 2012: Micro Learning As Innovative Process of Knowledge Strategy. – *International Journal of Scientific & Technology Research* 1(11), 92-96. Available from: http://www.ijstr.org/final-print/ dec2012/Micro-Learning-As-Innovative-Process-Of-Knowledge-Strategy.pdf

Leene A. 2006: MicroContent is Everywhere!!! Defining MicroContent.MicroLearning. Available from: http://www.sivas.com/microcontent/articles/ML2006/MicroContent.pdf

MoU/MG (Management Group of the ITU-ISO-IEC-UN/ECE Memorandum of Understanding concerning eBusiness standardization) 2012: *Recommendation on software and content development principles 2010*. (MoU/MG/12 N 476 Rev.1) Available from: http://isotc.iso.org/livelink/livelink/fetch/2000/2489/Ittf_ Home/MoU-MG/Moumg500.html

PC.COM (n.d.).Encyclopedia [viewed: 1. July 2013.] Available from: http://www.pcmag.com/encyclopedia/ term/52162/structured-data

Sánchez-Alonso S., Sicilia M.-A., García-Barriocanal E., Armas T. 2006: *From microcontents to micro-learning objects – which semantics are required? (Semantics for Microlearning)*, 295-304. Available from: http://www.cc.uah.es/ssalonso/papers/SanchezEtAl_Microlearning06.pdf

Wüster E. 1971: Begriffs- und Themaklassifikationen.Unterschiede in ihrem Wesen und ihrer Anwendung [Concept and subject classifications.Differences in their nature and in their application]. – *Nachrichten für Dokumentation*, n°3 98-104 and n°4 143-150.

Differences and Similarities of Micro-content and Structured Content (Including Terminologies and Other Language and Content Resources)

Zumpe S., Esswein W. 2002: Simplification of Knowledge Discovery using "Structure Classification". – Gaul W., Ritter G. *Classification, Automation, and New Media: Proceedings of the 24th Annual Conference of the Gesellsch aftfürKlassifikatione.V.*, University of Passau, March 15-17, 2000, Dresden, Germany: Springer, 245-252 [viewed 1. June 2013]. Available from: http://link.springer.com/chapter/10.1007/978-3-642-55991-4_26

MIKROTURINIO IR STRUKTŪRINIO TURINIO (ĮSKAITANT TERMINIJĄ IR KITUS KALBOS BEI TURINIO IŠTEKLIUS) SKIRTUMAI IR PANAŠUMAI

Elektroninio turinio tvarkyboje yra sričių, tokių kaip terminologiniai duomenys, bibliotekų informacija, daugelis produktų pagrindinių duomenų rūšių, kuriose turinio ištekliai – ir dėl standartizavimo pastangų – tampa integruojami ar bent suderinami. Kitose srityse galima pastebėti išsiskyrimo tendencijas, dėl kurių galiausiai išryškėja didžiulis pastangų dubliavimas. Švietimo ir mokymo srtityje yra labai daug turinio kūrėjų ir dar daugiau šios srities turinio išteklių, skirtų mokytojams ir mokiniams. Daugelį šių išteklių sudaro leksinės semantikos lygmens struktūrinis turinys, apimantis terminologinius, leksikografinius duomenis ir kitus turinio išteklius. Dabar tokie duomenys laikomi ir mikroturiniu.

Ankstesniuose darbuose terminologiniai, leksikografiniai duomenys ir kiti turinio ištekliai buvo laikomi pagrindinėmis leksinės semantikos lygmens struktūrinio turinio rūšimis. Dabar peržiūrimame ISO 1087:2000 standarte terminija apibrėžiama kaip „žymiklių, priklausančių vienai specialiajai kalbai, aibė". Žymiklis apibrėžiamas kaip „ženklas, kuriuo žymima sąvoka". Šio termino straipsnio pastaboje rašoma, kad „terminologijos darbe skiriamos trys žymiklių rūšys: terminai, simboliai ir tikriniai vardai". Šios ir kitos apibrėžtys tiesiogiai ar netiesiogiai apima ir nekalbinius sąvokų ir vardų (įskaitant tikrinius vardus) ženklus, kurie yra svarbūs daugelyje sričių, ypač švietimo srityje.

Mikroturinys yra labai naudingas ir reikalingas įvairiems verslo, viešojo administravimo tikslams, taip pat elektroniniam mokymui(si), tačiau jis dar retai tampa sistemiškai išplėtotu mokymosi objektu. Švietimo srities turiniui taikomi metodai turi būti suderinami tam, kad sukurtiems mokymosi objektams taip pat būtų būdingas semantinis suderinamumas.

Mikromokymosi ir mikrodidaktikos srities literatūroje aptariami ir mikromokymosi objektai. Šio straipsnio tikslas yra nustatyti, kiek mikromokymosi objekto sąvoka susijusi su mikroturinio sąvoka. Sistemiškai taikant terminologijos metodologiją galima pagerinti įvairiapusišką mikroturinio kaip mikromokymosi objektų naudojimą. Atsirastų daugiau mikroturinio naudojimo galimybių, jį būtų galima suderinti ir su elektroniniu turiniu apskritai, ir panaudoti elektroniniam mokymui(si).

Gauta 2014-06-05

Blanca Stella Giraldo Perez
Center of Translation Studies, University of Vienna
Gymnasiumstrasse 50, 1190 Vienna, Austria
E-mail sgiraldo@infoterm.org

Christian Galinski
International Information Centre for Terminology (Infoterm)
Gymnasiumstrasse 50, 1190 Vienna, Austria
E-mail cgalinski@infoterm.org