



SuperCyberKids

The SCK LF Competencies Explorer



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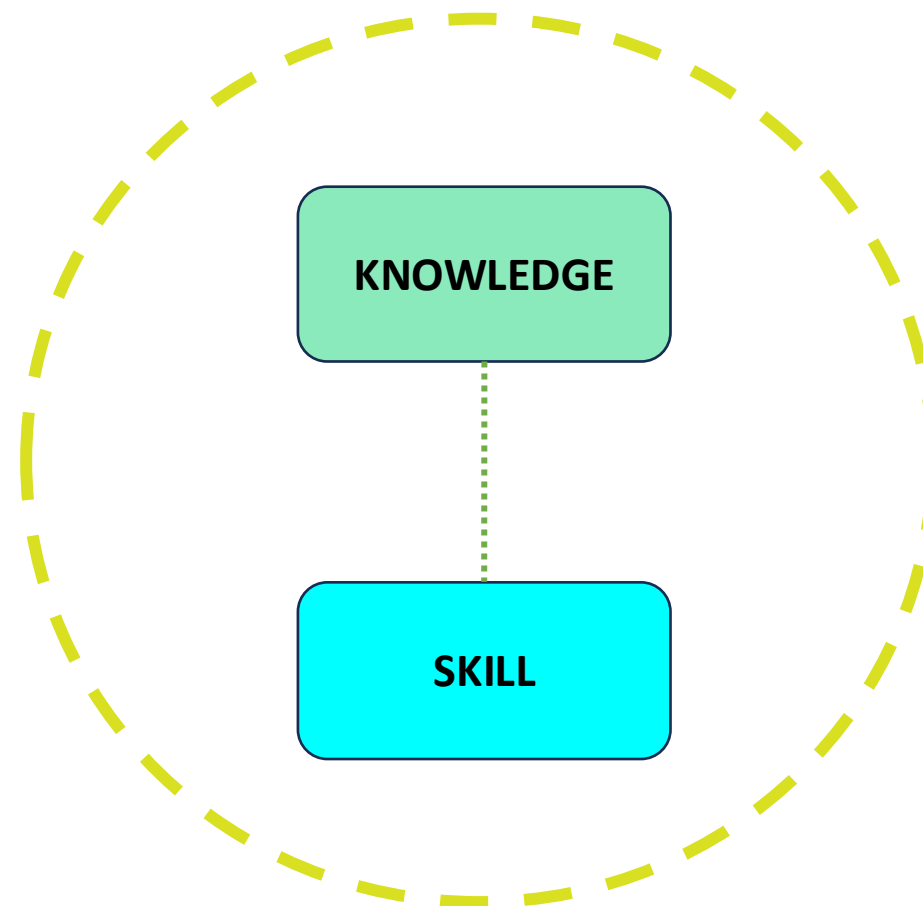
Let's talk about competencies



- Many different definitions used for the concept
- There is also linguistic confusion (Competency? Competence?)
 - Often times it depends on the context: Behavioural vs Task-oriented; USA vs UK;
- In almost all of the definitions Competence is formalised as a holistic concept
 - It is important to consider each part of the macro-concept of Competence to fully understand it
- This topic is addressed in more depth in the *SCK Learning Framework*, but in this context it is important to be mindful of the nature of the concept of competence

Let's talk about competencies

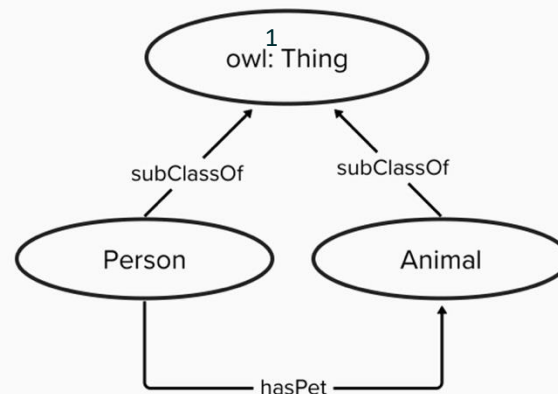
*“Competence is the ability to integrate and apply contextually-appropriate knowledge, skills and psychosocial factors (e.g., beliefs, attitudes, values and motivations) to **consistently perform successfully within a specified domain.**”**



Source: Vitello, S., Greatorex, J., and Shaw, S. **What is competence? a shared interpretation of competence to support teaching, learning and assessment. Cambridge University Press & Assessment, 2021.*

Ontology? What is that?

- An ontology is a structured representation of a knowledge domain.
- It is a formalism that is useful to clearly and more easily understand topics, but importantly it is also suitable for machine processing (e.g. Semantic Web).
- By virtue of their formal structure, ontologies have the benefit of being easy to share. This makes it possible to create large dictionaries, reuse concept descriptions, and in general disambiguate knowledge.



```

<?xml version="1.0"?>
<!DOCTYPE rdf:RDF [
  <!ENTITY owl "http://www.w3.org/2002/07/owl#" >
  <!ENTITY xsd "http://www.w3.org/2001/XMLSchema#" >
  <!ENTITY rdfs "http://www.w3.org/2000/01/rdf-schema#" >
  <!ENTITY rdf "http://www.w3.org/1999/02/22-rdf-syntax-ns#" >
]>

<rdf:RDF xmlns="http://example.org/ontology#"
  xml:base="http://example.org/ontology"
  xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
  xmlns:owl="http://www.w3.org/2002/07/owl#"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema#"
  xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#">

  <owl:Ontology rdf:about="http://example.org/ontology"/>

  <owl:Class rdf:ID="Person">
    <rdfs:label>Person</rdfs:label>
    <rdfs:subClassOf rdf:resource="http://www.w3.org/2002/07/owl#Thing"/>
  </owl:Class>

  <owl:Class rdf:ID="Animal">
    <rdfs:label>Animal</rdfs:label>
    <rdfs:subClassOf rdf:resource="http://www.w3.org/2002/07/owl#Thing"/>
  </owl:Class>

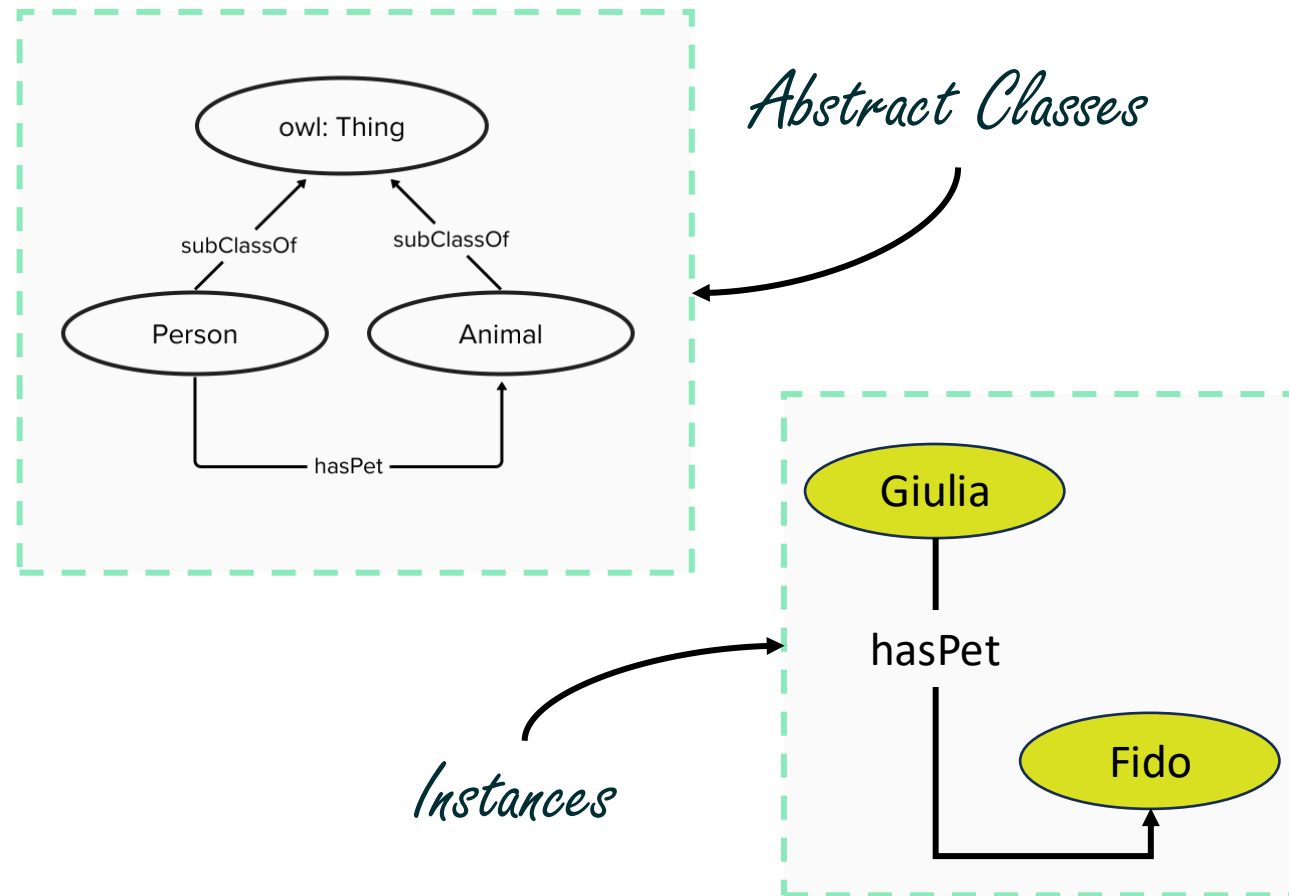
  <owl:ObjectProperty rdf:ID="hasPet">
    <rdfs:label>hasPet</rdfs:label>
    <rdfs:domain rdf:resource="#Person"/>
    <rdfs:range rdf:resource="#Animal"/>
  </owl:ObjectProperty>

</rdf:RDF>
  
```

1 - owl stands for "Web Ontology Language" and is a general purpose ontology useful to describe abstract concepts, as general and abstract as "things". In the example it is used to say that a Person and an Animal are both "things".

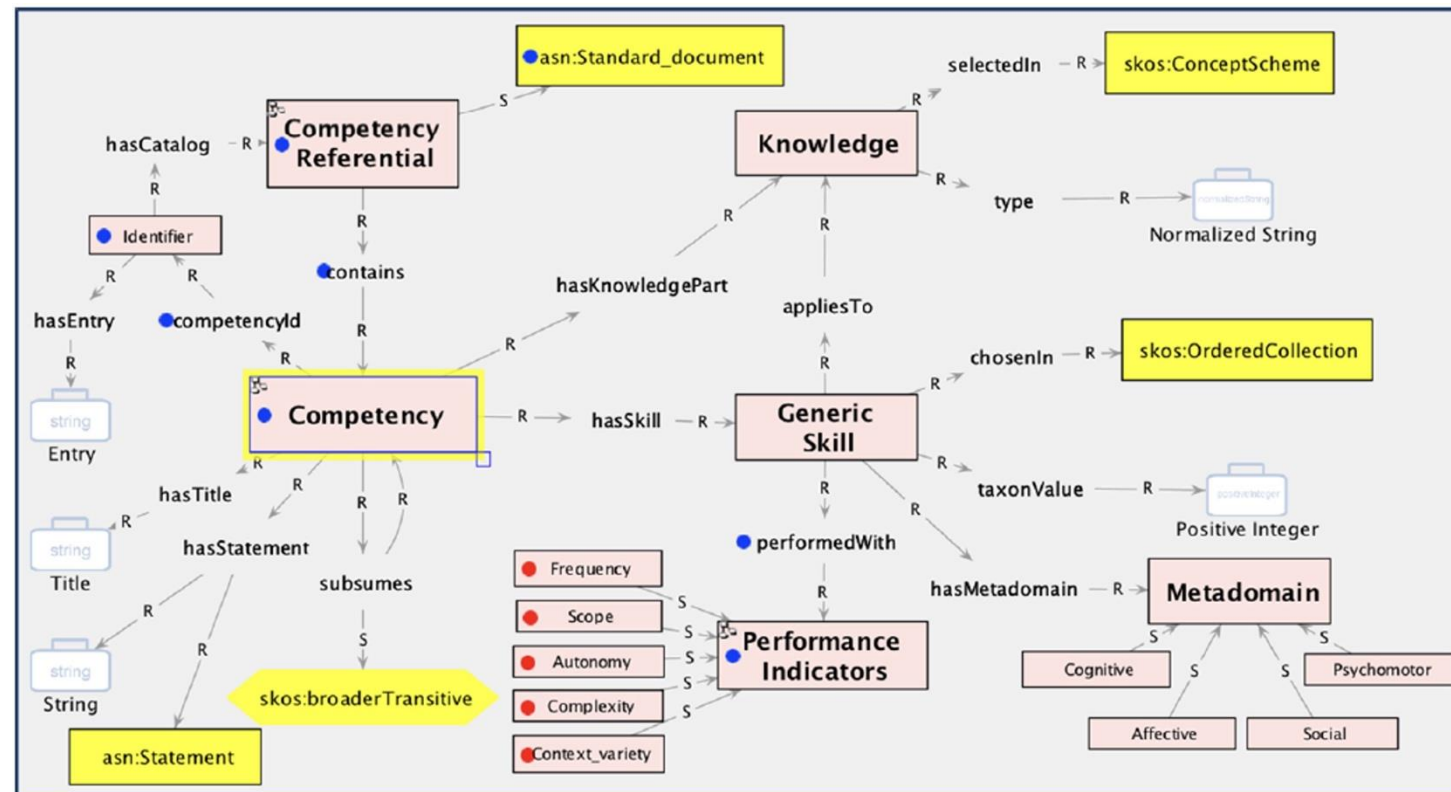
Ontology? What is that?

- An ontology defines concepts as classes:
 - the abstract representation of a category of elements
- Each ontology class can have concrete instances. For examples, "Giulia" is a concrete instance of the abstract class "Person"
- Classes and instances can be related to other elements through the use of relationships



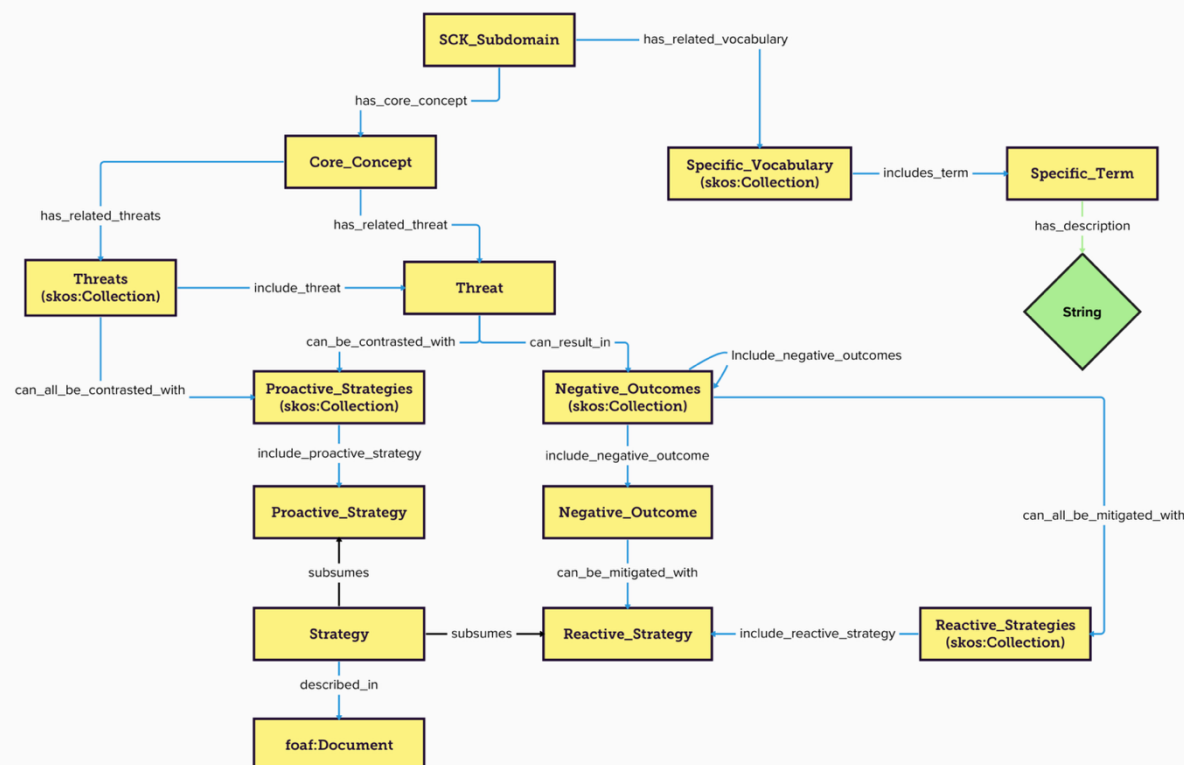
Formalising the concept of competence in an ontology

- In SuperCyberKids, to describe the concept of competence and its parts, we use an ontology already available in the literature: COMP2
- You can think of COMP2 as a vocabulary we use in order to be unambiguous and share a common representation of competence.
- As seen before, COMP2 describes a competency as being composed of some knowledge and some generic skill that is applied to it.



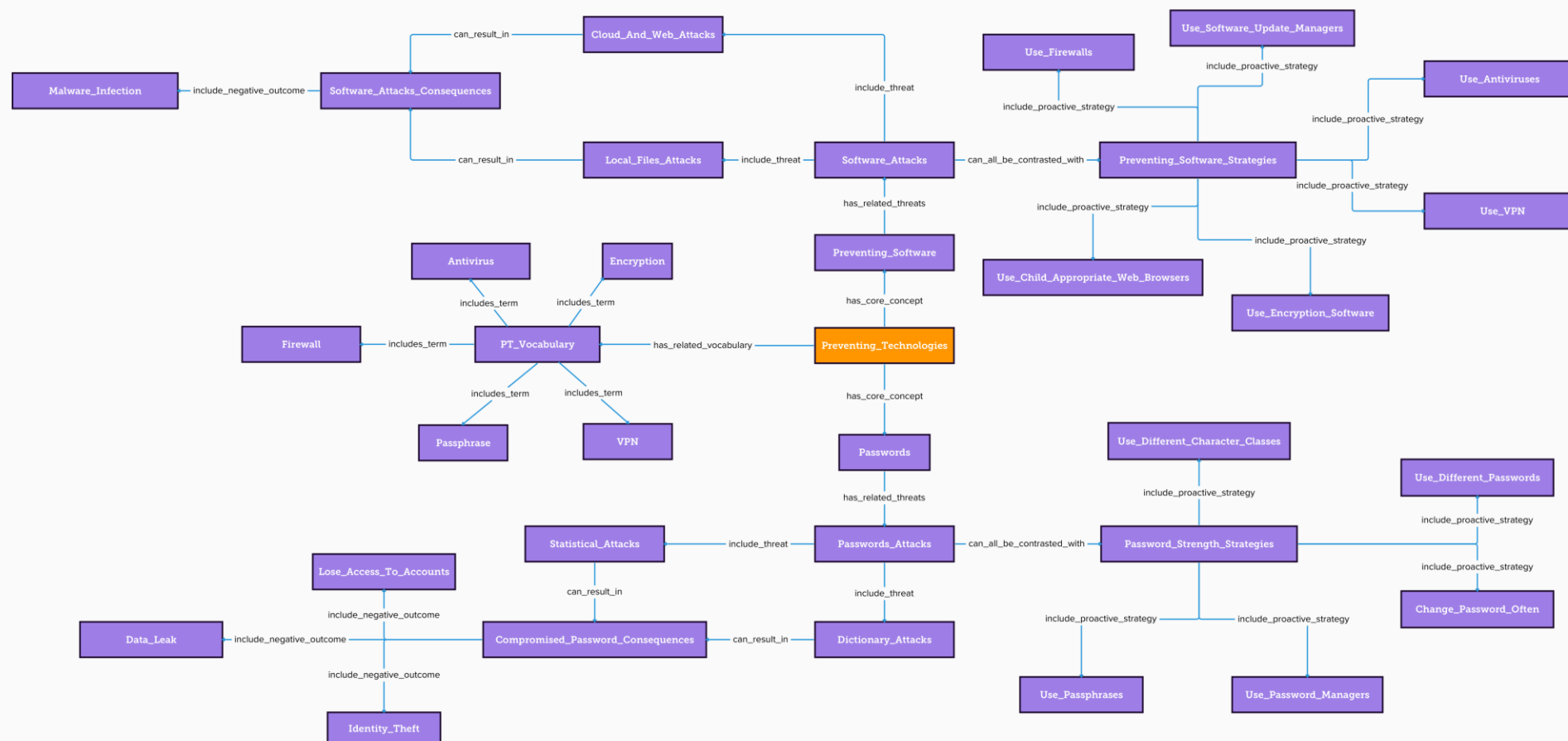
- For the description of the knowledge domains referenced by the competences, we created a new ontology.
- This ontology allows us to clearly and unambiguously define (i) the various classes of knowledge elements that we need to describe the various domains concerned, and (ii) the instances of concrete elements linked to them
- These abstract classes define the sub-domains, the key concepts of each sub-domain, the vocabulary used, the main threats together with the strategies (both proactive and reactive) used to prevent and mitigate the related negative outcomes

Core SCK Domain Classes & Relationships



The SCKLF Ontology: one of the instances sub-domains

Preventing Technologies





A tool to explore the SCKLF Ontology



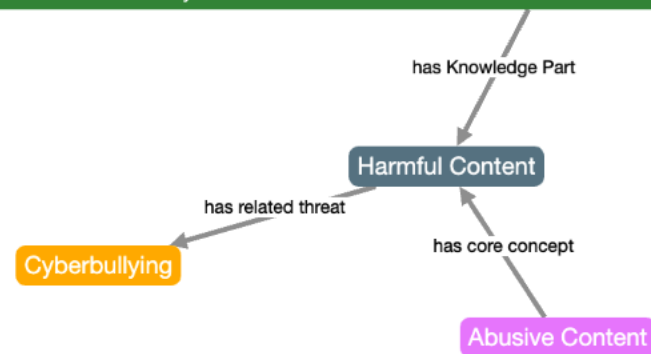
- As can be seen in the previous example, these knowledge formalisations can expand very quickly and become difficult to navigate, even when expressed in graphic form.
- This is why we have created a tool that allows the identification of skills related to a particular topic (or a particular keyword), helping the user in a smooth and gradual exploration of this knowledge space identified within the ontology.

A tool to explore the SCKLF Ontology

- The tool shows the network of concepts identified through a graphic visualisation in which it is possible to visualise both the elements and the relationships between them.

- For ease of visualisation, each category of elements within the graph is colour-coded, so that it is easy to recognise which abstract class each concrete instance belongs to.


Detect And Identify Online Risks And Threats That Need The Assistance Of An Adult And Ask For Help



- Although the tool automatically displays an optimal visualisation of the retrieved information, you can freely reposition any element within the graph as desired.


- Smart search functionality


- Competencies are found by using the smart search functionality, using topics and key terms
- The system will collect results based on the information contained in the ontology
- Competencies shown in the results list will be closely related to the search topics or terms used (even if the term is not present in the competency definition itself)





Use Strategies To Protect Against And Prevent Cyberbullying [Relevance Index: 8]	▼
Develop And Implement The Correct Actions In Cases Of Cyberbullying [Relevance Index: 4]	▼
Detect And Identify Online Risks And Threats That Need The Assistance Of An Adult And Ask For Help [Relevance Index: 2]	▼
Understand Online Etiquette And Behaviour [Relevance Index: 2]	▼


- Each competence shown in the results is accompanied and described by a relevance index
- This index shows how closely related a competence is to the term or topic used in the search



Use Strategies To Protect Against And Prevent Cyberbullying [Relevance Index: 8] 

Develop And Implement The Correct Actions In Cases Of Cyberbullying [Relevance Index: 4] 

Detect And Identify Online Risks And Threats That Need The Assistance Of An Adult And Ask For Help [Relevance Index: 2] 

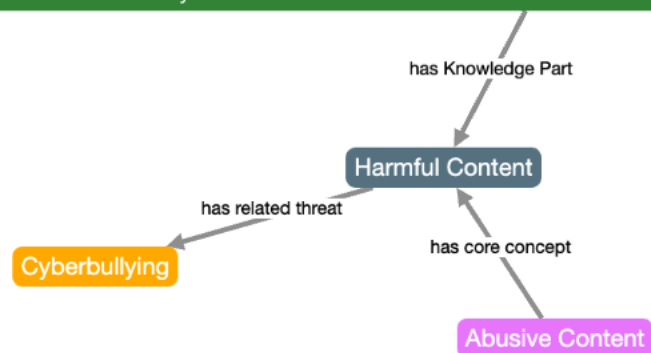
Understand Online Etiquette And Behaviour [Relevance Index: 2] 

Exploring the results: minimum set

- By clicking on each result, the system will display the minimum set of elements characterising the competence in question
- This set of elements is displayed by the system in the form of an oriented graph, making it easier to understand both the elements and the relationships between them
- This first set of elements allows the user to contextualise the result, see the link with the topic entered in the search bar, and begin to explore the concepts most closely related to the competence
- Each of the elements contained in the minimum set can be analysed by displaying the details. Similarly, each element can be used for a step-by-step exploration.

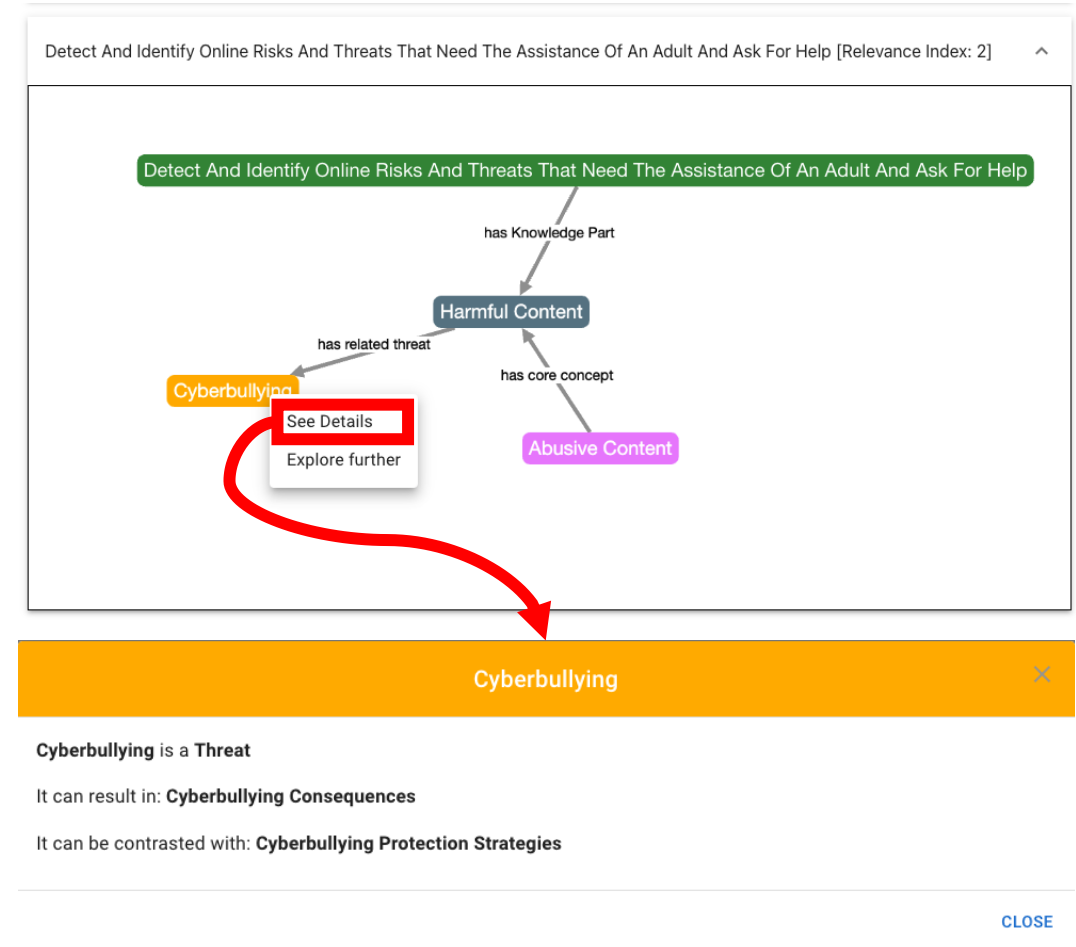
Detect And Identify Online Risks And Threats That Need The Assistance Of An Adult And Ask For Help [Relevance Index: 2] ^

Detect And Identify Online Risks And Threats That Need The Assistance Of An Adult And Ask For Help



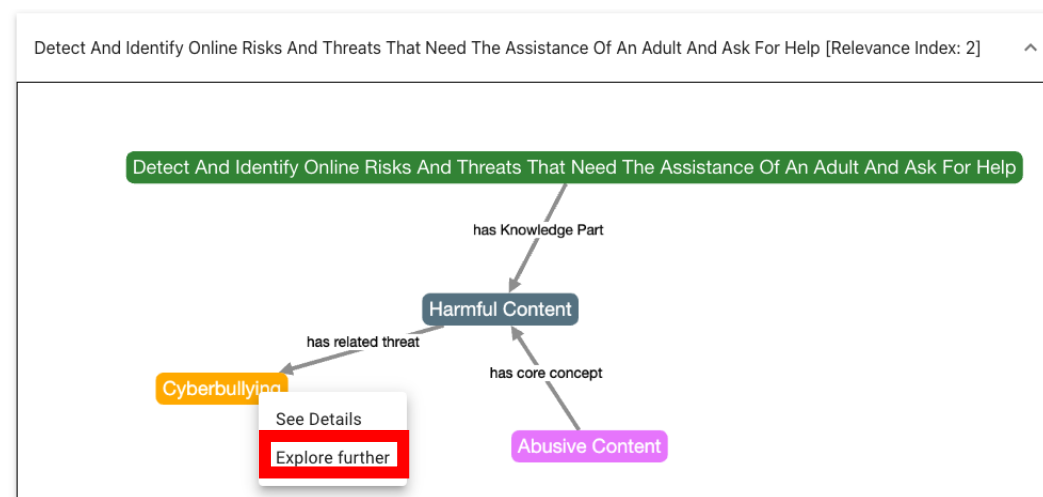
Exploring the results: inspecting the details of the elements

- By right-clicking on any displayed element, a contextual menu will allow you to choose whether to view details of the element or use it as a basis for further exploration of concepts.
- The detailed view (bottom) displays all direct information that characterises the element within the ontology
- Words in this view that represent key terms within the ontology are highlighted in bold



Exploring the results: step-by-step exploration

- Alternatively, clicking on 'Explore further' will expand the graph with new elements and concepts related to the selected item
- This allows guided, step-by-step exploration of the complex network of information contained within the ontology
- This way you can explore only the portions of information that you consider relevant and useful, while minimising unnecessary clutter.
- To facilitate visualisation, the system will also automatically reconfigure the arrangement of elements within the graph.



Exploring the results: step-by-step exploration

