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Creating digital collections based on Ontos proprietary technology

The digitalisation of education is making it increasingly important to use digital collections of sets of digital objects located in the cloud according to certain organisational rules (access, downloading, information validation policies, etc.).

An example of such a collection is the 'Scientists of the National Academy of Sciences of Ukraine' https://dnpb.gov.ua/kb_naps

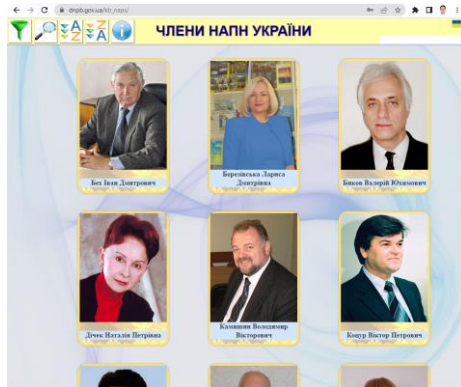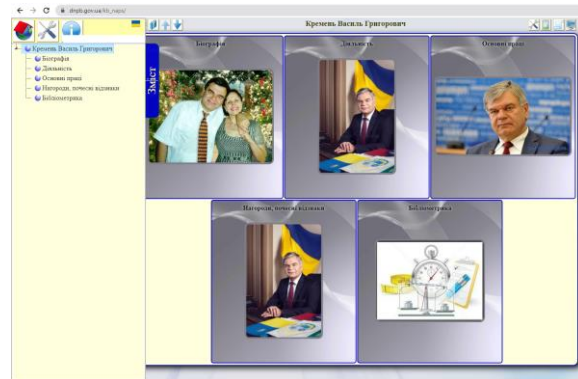Fig. 1.   Fig 2.

This project is intended to publish information about academics and corresponding members of the National Academy of Sciences of Ukraine. In fact, it is an electronic library (Fig. 1) that contains separate mini-books (Fig. 2) on individuals. This library has a user-friendly, friendly and intuitive interface. It has a search system, filtering by class, sorting, etc.

The collection was created using the author's web resource OntOS (Ontological Open System). OntOS is an online service designed to create electronic resources based on the use of **computer ontologies[1]**

The main idea of the project

The idea of the project is to develop a technology that can significantly simplify the creation of digital resources that can be represented in the form of hierarchical structures.

Examples where it can be applied:

1) collections of digital resources[2] (digital libraries, virtual museums, galleries, online store catalogues, classification lists, etc.

2) Structured electronic resources (e-textbooks, mind maps, a book of culinary recipes or other algorithms, etc.)
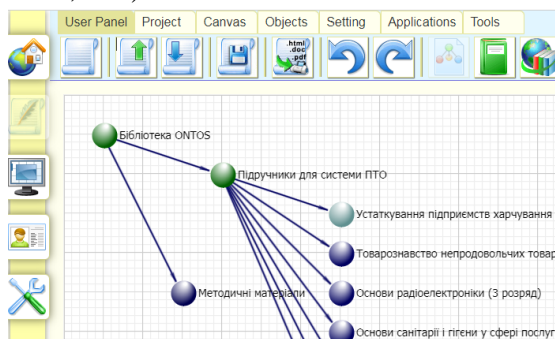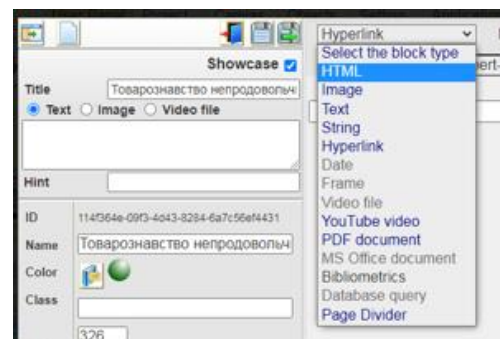

Fig.3   Fig.4

Project implementation

The author's resource is available at https://ontos.xyz/

The system consists of separate services designed to work with structured data.

The data is represented as an ontological graph - a set of objects (balls) and the relationships between them (Figure 1). Each object can be assigned a specific content of an arbitrary digital format (Fig. 2). This

includes interactive applications from other developers. GoogleForms applications, various tests, educational and game applications from https://learningapps.org/etc. have already been used (see Appendices)

The resource provides an extensive toolkit for working with graphs, automated presentation of graphs in the form of catalogues, interactive lists, tutorials, with various controls, export and printing capabilities.

Results achieved

To date, the work on the resource has been partially completed, but it has already helped to create a number of electronic resources and their collections.

These are **electronic textbooks**[3] and **digital collections** (list in the appendices)

The resource has been used to support classes in primary schools and higher education institutions.

A number of articles have been published to provide more detailed information on the principles of its operation (see Appendices)[4].

Appendices

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[1] **A computer ontology** is a formalised representation of knowledge about a certain subject area (environment, world) suitable for automated processing - a hierarchical structure of a finite set of concepts describing a given subject area.

In a simplified form, it is a certain set of interrelated concepts, their contexts and relationships between individual concepts.

[2] **Digital collection** is a systematic set of electronic documents and other digital objects united by common features, and with access to them and the possibility of using them together with metadata describing them

[3] **OntOS textbooks used in the educational process**

1. Commodity Research of Non-Food Products (level 3) - https://comexpert.pto.org.ua/

2. Commodity Research of Non-Food Products (level 4) - https://comexpert-2.pto.org.ua/ 3. Fundamentals of Radio Electronics (level 3) - https://electrician.pto.org.ua/

4. Fundamentals of Sanitation and Hygiene in the Service Sector https://tc-2.pto.org.ua/ 5. Technology for the Manufacture of Men's Trousers - https://tc-1.pto.org.ua/

6. Training and Methodological Complex for the Profession of Turner, Milling Machine Operator https://bcpl.pto.org.ua/

7. Equipment of Catering Enterprises https://book-3.pto.org.ua/

Digital collections created using OntOS

- 'Scientists of the National Academy of Sciences of Ukraine' https://dnpb.gov.ua/kb_naps/

- Ukrainian Language Online https://dnpb.gov.ua/ua/українська-мова/

[4] **Main Scientific Articles Describing the OntOS Resource**

1.   Guraliuk Andrii & etc. Ontological Visualization of Knowledge Structures Based on the Operational Management of Information Objects / Marina Rostoka., Andrii Guraliuk, Olha Kuzmenko, Tetiana Bondarenko, Lyudmyla Petryshyn // ICL2020 Educating Engineers for Future Industrial Revolutions (Tallinn, Estonia, 23–25 September 2020). https://link.springer.com/chapter/10.1007/978-3-030-68201-9_82

2.   Guraliuk Andrii & etc. Dual-Component Ontograph Visualization / A. G. Guraliuk, M. L. Rostoka, G. S. Cherevychnyi, D. O. Zakatnov, T. H. Pavlysh // Journal IOP Conference Series: Materials Science and Engineering (ICTTE-2020: International Conference on Technics, Technologies and Education) (November 4-6, 2020 in Yambol, Bulgaria). – 2020. https://iopscience.iop.org/article/10.1088/1757-899X/1031/1/012119

3.   Guraliuk, A., Rostoka, M., Koshel, A., Skvorchevska, Y., Luchaninova, O. (**2022**). Ontological Modeling of Electronic Educational Resources. In: Auer, M.E., Hortsch, H., Michler, O., Köhler, T. (eds) Mobility for Smart Cities and Regional Development - Challenges for Higher Education. ICL 2021. Lecture Notes in Networks and Systems, vol 390. Springer, Cham. https://doi.org/10.1007/978-3-030-93907-6_71

4.   Guraliuk A**.**, Zakatnov D., Lapaenko S., Ahalets I. & Varaksina N. (**2023**). Integrative Technology for Creating Electronic Educational Resources. *International Journal of Engineering Pedagogy (iJEP).* vol. 13(3), Pp. 68–79. https://doi.org/10.3991/ijep.v13i3.36109.