Journal Homepage: - www.journalijar.com

INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI: 10.21474/IJAR01/22938
DOI URL: http://dx.doi.org/10.21474/IJAR01/22938

RESEARCH ARTICLE

REPRESENTATION OF USER INTERFACE CONTEXT IN CIVIL SERVANTS TASK REGISTER WITHIN FRAMEWORK OF EXEMPLARY DIGITAL TRANSFORMATION AND LEARNING WITH ARTIFICIAL INTELLIGENCE

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Manuscript Info

Manuscript History
Received: 04 January 2026
Final Accepted: 08 February 2026
Published: March 2026

Key words:-
learning, digital transformation, AI, best practice.

Abstract

Goal,problem: How to define context in User interface of Civil servants Task Register within the framework of exemplary Digital transformatio n and Learning using AI? Common context: shifting understanding, explanation, paradigms related of opportunities, challenges in condition s of changes for everyone. Based on our arrow theory, proposed Matrix (Table)model of this context representation. It starting from Abstraction highest level to practical Realization website for exchange exemplary projects, ideas, tasks and solutions of Comunities, Teams, Persons (demo.vledl1.org). And included identification, adoption, alignment and integration of basic scientific disciplines achievements: mathematic s, psychology, linguistics, learning, pedagogy, computer science, project management

Introduction:-

"In normal cases, it is very difficult to predict the future, for example, 10 years ahead. Today it is even more difficult, given how quickly AI is changing — changes occur even week after week. The only thing that can be said for sure is that huge changes are coming — and they are primarily in education … The key skill for the new generation will be the ability to "learn to learn", that is, not just to absorb information, but to be able to independently seek knowledge and adapt to changes". Demis Hassabis, Google DeepMind CEO (Hassabis, 2024). The acceleration and spread of Digital transformations (DT) and Artificial intelligence (AI) creates unprecedented opportunities, problems and challenges for everyone. Our research is the targeted development and practical verification of arrow theory, innovative models, projects, AI, Big data, behavior analysis, analytics (Manako, 2024), (Manako1, 2025), (Manako2, 2025), (Manako3, 2025), (Manako4, 2025). This study describes the representation of user interface context in civil servants task register within framework of exemplary DT and learning with AI. Contents. Framework. Knowledge gap, Problem, Idea and principles, Model; Practical realization projects,, Results, Dscussion, Conclusion, References.

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Framework:-

"The future isn't just happening to us anymore… We make decisions every day that determine what decisions we will be able to make tomorrow … None of us is as smart as all of us — That's good, because the problems we face are too complex to be solved by any one person or any one discipline". (Hodgins, 2006). Knowledge gap;-In article "Management system for the Exchange of exemplary projects of Civil servants: vdedl1 project User interface (Manako, 2026) describes "Virtual Labs for Exchange exemplaryDT, Learning ideas, samples for projects teams, VLEDL" (demo.vledl1.org). Let *S:* "Management system user interface models are proposed for civil servants: project teams with Virtual labs for exchange exemplary solution". Exchange covers very defined processes and events patterns, templates such as identification, інтеграція, joint sensing, measurement, collection, cleaning, processing, storage, visualization of information, real time analytics, evaluation, providing forecasts, insights, recommendations. This will allow all stakeholders to best personally manage the exchange of exemplary solutions in a variety of contexts and effects. In the arrow theory at the highest level ofAabstraction, the axiomatic method of formalization is used to **S** and the rules of inference and logic are explicitly introduced. Viewing S as a certain type of mathematical category expands the possibilities of the modeling method, gives a unified view of the concept of a model. ***S*** is an evolutionarily complex decision-making system, which is represented from the point of view and perspective of fundamental scientific disciplines in different natural or formal languages, cultural environments and spaces. The key subsystems are Virtual Laboratories, of the Research, master classes for Learning and Trainings using smart simulators of situations and contexts, the real time analytics for unique personal projects and project teams. The basic disciplines of representation **S** are mathematics, psychology, linguistics, learning, pedagogy, computer science, project management.

General Model S is written as:

<S>=<<Smat><↔ ↕><Sint>>, <Smat> і <Sint>: mathematized representation of S and its meaningful interpretations in the form of content aggregations; <> is the designation of the combination of what these brackets contain. A general example of a modeling construct <>: these are concepts, ideas; visualizations; arrow shapes: "→, or with the opposite direction ←"; a set <>, the brackets of which have the properties "existing, new, mixed. For example, not quite accurate or defined"; the arrow "person" has or may have a set of arrows, called an e-portfolio with the history and plans of the person's practices or experiences in time and space; Arrow content: structured information about the existing or imagined properties of the arrows, which is presented as an "Information Model"; at a higher level of abstraction, <S> is defined using a mathematical theory of categories, often called "arrow theory" and "arrow sets", which are described in the RDF/XML language for presenting information about resources on the web (resource: something that can be identified by a URL). RDF conceptual idea: using sets of simple statements (subject, predicate, or object) about (a resource, a resource property, or a property value) to describe things. Notation X → Y, where X, Y denote the ends of the arrow, expresses the relative presence of the properties of object X in the properties of object Y. In particular, that in the relations "form-content", "subject-object" from the old, progressive, successful has passed into the new or, conversely, during the life of the subject or from standards, etc. Examples of visual forms of the arrow object: straight, arc, dash-dotted, thick, colored, with sound. Examples of other interpretations of the arrow object: relation, reflection, Cartesian square., function, function, operator, procedure, algorithm, process, event, activity, arrows from traffic rules, on the streets or from a monograph. The properties and characteristics of arrows are represented using standard sets of attributes, metadata, tags or variables.

The general model for Samples Task Register S:

< Task Register of GUI, TRui> = <<< context> <<S > <SI> <PROC> <PIO> <CR>>>;
<S> = << metaphor >< paradigm: ui: **GUI**>>;
<metaphor> = < <metaphor: ed> <metaphor: learning> <metaphor: ai>…>;
<SI> — a set of arrows "Information representation S";
<PIO> — a set of arrows "Statement about S";
<PROC> — a set of arrows "Find the value of PIO" using the <exemplary BFS >;
<CR> — a set of arrows "Evaluation criterion".

GUI Paradigm (Veenstra, 2011), WIMP:

Windows: Rectangular areas on the screen for running applications, allowing multitasking.
Icons: Small pictures representing files, programs, or actions (e.g., a trash can).
Menus: Lists of commands or options, often appearing when you click something.
Pointer: The on-screen cursor, controlled by a mouse or trackpad, for selection and interaction.

Example verbal definition. Context (adapted from https://dictionary.apa.org/context): 1. Generally, the conditions or circumstances in which a particular phenomenon occurs; 2. In studies of cognition, the environment in which a stimulus event occurs, especially as this influences memory, learning, judgment, or other cognitive processes; 3/ In laboratory tasks involving the recognition of stimuli, the setting in which a target stimulus is presented, including any distractors or maskers (see masking). See also (Vroom, 2007).

Model of <context> for Task Register S:
<<**context:** learning > <event > <area> >,
<event>: <<metadata> <annotation> <comment> <search> <view> <question> <load more> <record > …>;
<area>: <<prerequisite> <metadata> <role> <action plan> <didactic method> <concept> > <illustration> <not illustration> <test> …>.

Clearly, this contextual model is incomplete starting from the highest level of Abstraction. Therefore, based on our arrow theory, we proposed a general Matrix model (table) to represent this context

Problem, :-
How to present context in User interface of Civil servants' Task Register within the framework of DT and lLarning usingAI?

Idea and principles:-

Idea : The context model defined in the form Matrix (Table) математичною мовою стрілок. This Matrix is a dynamic system, a process. It is represented according to the following principles:
Basic principle (formulation in natural language): People should not “run” after newest Samples but vice versa, newest samples should “run” after people. Its content is represented by the proposed arrow principles. Min-Max principle. This is the principle of unity of close and distant goals sustainable development of S, ED. It is practically implemented by the method of integrating the results of horizontal and vertical reduction arrow method according to rules such as: Minimal options are implemented top-down, starting from the maximum; And vice versa, Maximum options are implemented bottom-up, starting from the minimum. Given the acceleration of DT and their impact on change, it is advisable to update projects in real time. Personal-centricity principle: The minimum unit of projects is a unique personal project of each participant in a joint project; AI is an additional reliable means of survival and sustainable development. The decision is made by a person. All newest arrow patterns are timely made as personally-centric, metaphorical, known, practical as possible and timely "run" after persons with newest best practices, samples. “BFS based on newest best practice” principle. Duality principle If there is an entity, then there is usually its double (and vice versa), which is represented in convenient forms. The construct Double is defined in a formalized dictionary with the meanings: Contextual, Digital, Exemplary, Mathematical, Metaphorical. Artificial, Psychological, etc. principle (See also https://en.wikipedia.org/wiki/Duality_(mathematics). The principle of "Partial understanding". If something is not defined, then it refers to something more generalized. For example, a project context of the Person or Teams may be defined in Community.

Where ED: Exemplary Double of sustainable development of unique human-centric projects is a personal decision-making system, defined process. Key properties:
►The S, ED are represented by a stack of fundamental arrow elements – projects Digital Transformation, Learning, AI in a problematical, metaphorical and innovational spaces.
►All Samples of S, ED are made as person-centered, metaphorical, known, practical as possible, and move in a timely manner with the best practices.
► The S system instance includes all ED system instances (and vice versa), each of which has all the information about the entire system based on real time analytics.
► The promotion of sustainable development of ED is carried out on the basis of arrow principles, criteria and a common arrow Strategy.
►The S, ED systems function in the form of adaptive virtual organizations.
►The metaphor of the S, ED is the Exemplary companion (fellow traveler, voyager) among Best First Search trajectories in project groups such as Communities, project Teams, Perrsons. The main evaluation criterion is the degrees of Exchange of newest ideas, task, solution and samples. It is usually represented by aggregations (combinations) of commutative triangles, Cartesian squares in a problematical, metaphorical and innovational spaces.

Exemplary (sample): 1) serving as a desirable model; representing the best of its kind; 2) concerns best practices, patterns sustainable development of entity, phenomen, object, system in scope DT, learning with AI.

Model:-
Example verbal definition (https://www.populismstudies.org/Vocabulary/status-quo/) Status quo, SQ: the existing state of affairs, especially regarding social or political issues. a Latin phrase meaning the existing state of affairs, particularly with regard to social or political issues. In the sociological sense, it generally applies to maintain or change existing social structure and values. With regard to policy debate, the status quo refers to how conditions are at the time and how the affirmative team can solve these conditions. To maintain the status quo is to keep the things the way they presently are. See also in (Haas, 2023).

Basic model Status quo, SQ for S defined by Reduction method, <↔↕> in form of defined process:
<SQ>=<<↔ ↕>< SQi><↕↔>< SQj>>, where *i, j* are an integers.
Let <Sc> be all combinations of competences that are known to project Communities, Teams, Persons in the newest SQ.

Then the competence Space defined as sequences:

$$<Sc> = << Sc_1>< Sc_2>\ldots <Sc_i>>.$$

Each Sc_i has its own discrete scale of various metrics, such as a partially or linearly ordered set of values. The order of these values is determined by a certain class of relations, events such as is-part-of; has-part, is-based-on; is-basis-for, requires; is required-by. Competencies are then defined in the form of <Sc> → Sc_i based on newest best practices, solutions, guidance materials, standards and laws, which are also rapidly changing. An example of presenting instances of Teams samples (**t**). Let's define the manifestation (representation) Sc, the resources of which were or can be accessed by end users. The starting manifestation of Sc is usually determined taking into account the established context of Sc, in particular, scope, goals, etc. Let Sct (k) be the description of entities (objects, processes, components) of k manifestations of Sc. Then the next manifestation of Sct (k+1) is defined as follows:

$$<Sct\ (k)> = << Sct1 >< Sct2 >\ldots <Scti>>,\ i = 1, 2,\ldots, m(k).;$$
$$<Sct(k)>\rightarrow Sct\ (k+1)i;$$
$$<Sct(k)>ij\rightarrow Sct\ (k+1),\ i = 1, 2, \ldots\ m(k),\ j = 1, 2, \ldots\ e(k)\}$$

where: Sct(k+1)i is a representation of the i-entity of (k+1) manifestation; Sct (k)ij is the representation of j-manifestation i of entity in (k) manifestation S; → direction (the process of forming a description). All entities with Sct(k+1)i representations are integrated, i.e., inherited in (k+1) manifestations of SQ.

An example of the process of inheritance of the input-output system, decision-making
< S> = <<Sct><Sct>>,
Sct is a set of problems associated with Sct. If the pairs (<<Sct><Sct>>, ≤), where ≤ is a relation of partial order, satisfy the conditions of reflectivity, transitivity and antisymmetric, then the set X belongs < S> is "inherited" if it is closed during the movement "up", that is, if x належить X and x ≤ y imply that belongs X. Sample management in<>, S is carried out to achieve the multiple goals of various project teams. A certain goal is considered achieved if a certain set of problems (tasks) associated with it is solved. Then, to define a strategy (long-term plan) for sustainable development S, it is appropriate to mathematically represent it in the form of hierarchical structures, which may not be the best in a certain context or situation, but the crucial thing is that they are much easier for people to understand and use.

Practical Realization Projects:-
Project: unique process consisting of a set of coordinated and controlled activities with start and end dates, performed to achieve a goal that meets specific requirements and that has constraints on time, cost, and resources (ISO 10006, 2017). The main idea, purpose (function) of building non-commersial open VLEDL1 website: Validation arrow theory newest achivements; Formation and practical realization lifelong projects for Civil servants; Growtht of organizational structure and regulations VLEDL1. This will help people improve their personal understanding of the status quo in a timely manner based on the newest best ideas, tasks, solutions. Based on the arrow theory, to build a simple, reliable, intuitive matrix of context representation in the user interface, the following 4x5 structure is proposed: 1) Columns: Communities, Teams, Individuals, specific users; 2) Rows: Tasks, Analytics, Samples, Exchange, ED. Then any context is an aggregation (combination, data set) cells. And the Excel table is a simple metaphor for this matrix. The validation (Chen, 2025) of the newest achievements of our theory is carried out literacy and competencies of the Terminology(2022, Cíbiková), arrow Glossary, Consciousness,

psychological literacy (Newell, 2024), (digital) Leadership (Vroom, 2007), (Fotso, 2024),(Digital) Leadership theory (DIGIGEN, 2025), AI literacy and competencies (UNESCO, 2025). (Xie, 2025) lifelong projects. The goal, problem of this lifelong projects: sustainable Growtht of latency and competencies for Civil servants. Examples decomposition. Overview of terminology and definitions: See in the table (https://www.die-bonn.de/state-of-the-art/dl/tube_eng.pdf).

In (McGovern , 2010). provided a definition of psychological literacy more fitting this newer understanding of literacy, including the following elements:
Understanding the basic concepts and principles of psychology
Thinking critically
Having problem-solving skills
Understanding scientific research practices
Communicating well in different contexts
Applying psychological principles to personal, social, or organizational problems
Acting ethically
Having cultural competence and respecting diversity
Having self and other awareness and understanding.

A simple and comprehensive Leadership definition (Nerdinge, 2019):
Leadership: the conscious and purposeful influencing of people.
Conscious - A leader consciously uses their position to achieve something.
Purposeful - A leader aligns their leadership actions with (entrepreneurial) goals.
Influence - A leader influences the actions of other persons/employees.
o**n People -** Interaction between the person leading and the people being led.

The review (Fotso, 2024) proposed 18 leadership competencies: Adaptability and flexiblity, Values, Cognitive Skills, Transformational Communication, Human orientation, Ability social skills , Organisation skills, Ability to handle complexity ,Knowledge,,Global Leadership, Collaborative . See also identified discussion Questions for further research (Table 2) and 8 Discussion and conclusions section.Example of project, task structures from the VLEDL1Website**:** Virtual Laboratories, of tResearch, Master classes for Learning and Trainings using smart simulators of contexts; Glossary of Arrow Theory Concepts (in which basic verbal definitions has mathematical interpretation), Consciousness, Leadership AI. Virtual Labs intended for or Exchange exemplary DT, Learning (ideas, tasks, projects, samples, best solutions) for all stakeholders**.** Website launch date (demo.vledl1.org): 2026-03-23. We invite experts to cooperate with our Scientific Council and look forward to your suggestions.

Results:-

Common problem, goal. How purposefully to improve DT, lifelong learning with AI for mass Civil servants in **context** of multilingualism, multidisciplinary, cultural diversity, multimodality and impact of increasingly rapid change at all levels?
Common context: "Shift understanding and explanation" of today's unprecedented opportunities, problems, and challenges for everyone It will change in thinking, understanding and explanation of the best newest DT, learning with AI literacy and competencies. It based on the adoption, alignment and integration of the achievements of various scientific disciplines, technologies in different areas of application and territories. One of the possible ways, solutions, is application of a new dynamic object^ Exemplary double which will allow all interested parties to best personally manage the exchange of exemplary solutions. End result of will be people armed with the best competencies of the 21st century in a timely manner.

Main result of this research is defined of science-based complex dynamic system and OPEN VLEDL1 project for Civil Servants personal task register' and basic model. Proposed Matrix (table) model of context starting from the highest level of Abstraction to level of practical Implementations.. It will allow all interested parties to best personally manage the exchange of newest exemplary solutions. And people will timely armed with the best competencies of the 21st century in a timely manner

Conclusion:-

"The future isn't just happening to us anymore… We make decisions every day that determine what decisions we will be able to make tomorrow … None of us is as smart as all of us — That's good, because the problems we face are too complex to be solved by any one person or any one discipline". "We all have a skills gap, all the time. When

new knowledge is created at a rate faster than workers can learn it, a shortage results, no matter what the subject matter. This is not a problem that we need to fix. The skills gap is a ubiquitous characteristic of life in the future we envision, because everyone will have needs for new technology(and other) skills. Creating support for lifelong learning in a variety of forms is imperative to successfully addressing this fact". (H. Wayne Hodgins, 2006). The common problem is that the huge potential of using advanced digital technologies for DT, learning with AI is still not mass practical used for various purposes. It requires solving many complex scientific and practical problems, tasks, such as understanding and explanation, elimination of uncertainty, adaptation, alignment, management, forecasting, control, evaluation, leadership, evolution, variability, complexity, scalability, property protection and confidentiality, reliability, compatibility, harmonization with existing official and de-facto standards, procedures, protocols, regulations (Veenstra, 2011), (Radu, 2024). The results of authoritative studies show that less than half of projects have a digital strategy. 41% of organizations claim that they lack the right digital skills, and 30% claim that they know which technologies should be adopted, but 79% of organizations have not fully implemented AI governance at scale (PwC). At the same time, demand for lifelong learning education services, training and advice on digital and AI literacy is growing rapidly (UNESCO, 2025), (Xie, 2025). One of the possible ways to help solve these problems is the practical implementation of the achievements of the our arrow theory. It practically realization in open VLEDL1 project, complex dynamic system S:

"Virtual Labs for Exchange exemplary DT, Learning with AI (demo.vledl1.org). The common context is shifting understanding and explanation, paradigms related of opportunities, problems, issues, challenges in AI era for everyone. The validation (Chen, 2025) of the achievements of our theory is carried out Literacy and Competencies of the Terminology (2022, Cíbiková)., Consciousness, (digital) Leadership (Fotso, 2024). (DIGIGEN, 2025). AI (UNESCO, 2025) lifelong projects. The VLEDL1, S project Communities, Teams, Persons achieves uniqueness for concrete user in very contexts by: +Systematic and sustainable improvement of understanding, explanations and practical use; +Metaphorization, Mathematization and Visualization of their representations; +Control, prediction, feedback and recommendations; +Analysis of the Status Quo dinamics; +Using means of AI, Big data, Real-time analytics. Benefits of practical using VLEDL1, S for all users and contexts: +Personal confidence and readiness: Reliability: Reliability metrics are defined and applied based on scalable VLEDL1, S best practices, allowing person to perform the personal projects with a reliable counterpart in the actual context (virtual environment or situation) with reliable means.

This way, personal confidence and readiness to make newest exemplary decisions about mine loyalty in real time is achieved; +Safety: Significantly reduces the risk by perform the personal projects in the actual context by smart simulators; +Accessibility: Perform the personal projects in the actual context makes more accessible as smart simulators can be deployed in different areas, reducing costs and the need for redeployment;. +Cost-effectiveness: Reduces the costs associated with organizing live project events and ensuring safety protocols in traditional actual context. +Scalability: Facilitates performs the personal projects in the actual context training of large numbers of beginners, experts, trainees and others according to assessment criteria, indicators and systematically improves everyone readiness for exemplary DT. Website launch date: 2026-03-23 (demo.vledl1.org). We invite collaboration from interested parties. Dmytro, Executive Director of VDEDL1 LLC (dmanako@gmail.com). We believe in the power of our arrow theory

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