Asian Journal of Applied Science and Technology (AJAST)
(Open Access Quarterly International Journal) Volume 2, Issue 3, Pages 259-273, July-September 2018

Towards the Semantic Web Personalized Search Result and Learning Style

Maged Elazony, Ahmed Khalifa, Sayed Nouh, Mohamed Hussein and Momtaz Al-Kholy

Faculty of Engineering, Computers and Systems Engineering Department, Azhar University.

Article Received: 30 April 2018 *Article Accepted: 31 July 2018* *Article Published: 13 September 2018*

ABSTRACT

Online learning has extremely beneficial in providing cost-effective education irrespective of geographical boundaries and time In online learning systems different Authors use different terminologies to create the learning objects, in this case, the searching of learning materials becomes very difficult, and, significant Learning materials can be reached only if it's specific the correct title, Furthermore Classical search engines very closely related to the spelling of the word not to the meaning , in this paper we developed a Personalized Search and learning style approach response to different online learner's knowledge, interests, motivations, needs ,objectives and preferences, in this approach the system automatically matching the online learner profile and learning objects to determine a most suitable relationship, Therefore, it will advise him with the most appropriate learning materials and learning style and solve the problem of naming conflict, the new approach in this paper propose a solution of synonyms and homonyms naming conflicts, and we will give a short brief about How Block chain technology Is Impacting e-learning systems, Furthermore, we made an experiment to evaluate the performance of the proposed approach ,the experimental results show that semantic search and learning style using the semantic similarity approach is efficient and helpful in improving both the learning achievement and efficiency of individual learner and is expected to show great advantage to online learners.

Keywords: Ontology languages, Personalization, Information filtering, Information Search and Retrieval.

1. INTRODUCTION

Web-based Training system has many benefits for Online learners by making access to Training objects at any time or anywhere, very fast, just in time and relevance. Nowadays, big challenge in Classical online learning systems to offer the right and appropriate learning materials to the right learner in a correct way [1] [2]. Nevertheless, the major problem existed in current online Learning system is the amount of time spent searching for the right content (Time limitation), the absence of personalization and information overload. The main objective of e-learning system to help online leaner acquire knowledge at his own pace, in the attractive environment and as flexible as possible. Furthermore, With the fast increasing of courses and learning materials in a diversity of media formats(information overload)and lack of accuracy, it becomes quite difficult and complicated task for online learners to find the appropriate learning materials based on his knowledge, interests, motivations, needs, objectives, and preferences. on the other hand, each online learner has individual needs and learning style, Learners' learning styles that reflect their cognitive abilities vary in known ways; Not all online learners learn at the same rate and in the same way, some online learner learn easily in a visual instruction style, while other prefer the oral presentation or traditional text-based content. Furthermore, semantic web technology SW has the possibility to be using in different areas, online learning is one of the most interesting domains which will benefit from the semantic web technology. Therefore, Semantic Web technologies support search engines deliver better search outcomes to the online learner [3].

Moreover, we need to represent the knowledge in a different format on the same learning material and adapt to different learners requirements and queries. In addition, the search and retrieval of learning information should be automatically customized to learner's preferences and needs. To achieve these objectives, we use semantic web technologies which help the machines to understand the meaning in these documents [4]. Furthermore, Classical search engines cannot understand the text inserted by the learners and his interests. Because it's very closely related to the spelling of the word not to its meaning and they base on a set of keywords that are inserted by the online learner, for the search based on syntactic to get the desired outcomes with a different indicators lead to incorrect results, irrelevant or no outcomes to all learners when searching [5].

Although leaning materials are contributing to enhancing the knowledge of the online learners, Some problems happened such as more than one learning system may use different identifiers and naming for the same concept, in contrast, When the Online learner search for learning objects, and Learners often cannot specify appropriate and exact keywords for a valid query. Keyword-based model that is based on keywords matching leads to "too many or nothing ", there is no way the system can learn what the leaner means and requires by such queries. By using the semantic web the data represented in a machine-readable structure and hence improve the search result by applying inference rules on the information to obtain meaningful outcomes and solve the conflict naming problem. related with this main content, In an online learning systems the different learning objects creator use different terminologies and naming when creating the learning objects, in which case the combination and searching of learning objects and course materials becomes very difficult, In this case, Learning materials can be reached only if it's specific the correct title. These naming conflicts can be synonyms, homonyms or polysemy conflicts, this problem is derived from the lack of semantics in the learning content. One of the main objectives of this paper is to provide a consistent introduction into issues and methods for realizing Adaptation and Personalization learning using Semantic Web. Furthermore, the leaner's preferences change over time and the system should track them and properly adjust to them. The whole history of the online learner learning behaviour taken into consideration, and not just the leaner's recent actions, we are also faced with the need to adapt the learning process to the progress of the online learner, his preferences, as well as current competencies, to ensure that the system is both effective and efficient, especially considering information overload and the existence of the multitude of learning objects. And the major problem faced by the learner in the online learning system is the quantity and quality of the results returned by any search. Personalization of search result and learning style is a popular remedy for this problem [6].

In this paper we design and implementation of knowledge-based industrial reusable, interactive web-based training system at the seaport and logistics sector and use online learning based on semantic web to deliver the learning contents to the Online learner in a flexible, interactive, and adaptive way. In this approach, we illustrate this procedure by using Recommender systems for online learning environments to recommend useful materials to learners based on their priority, knowledge, interests, motivations, needs, objectives and preferences. We find that adaptive recommendation online learning system using Semantic Web technologies will help the online learner to find the information and learning object easily and relatively. To demonstrate the potential use of the proposed framework, a system prototype for adaptive recommending learning objects at Damietta seaport in Egypt was implemented to enhance the performance of the traditional query-based information and learning contents retrieval approach and Personalized Search Result and learning style. And we will give a short brief about How Blockchain Is Impacting e-learning systems. However blockchain principles were first applied in the financial world as the technology that allowed Bitcoin to operate, we think it will have applications for many industries including learning.

2. A RESEARCH METHODOLOGY

The research methodology in this paper was prepared in the frames of a constructive method. The constructive research method in this paper takes following steps (1) literature review; and (2) problem identification; (3) Theoretical framework; (4) practical implementation and (5) experiment On the other hand, a systematic review of related works and analytical research methods were used for revealing the advantages of online learning system using Semantic Web technologies and recommendation system to adaptive learning and searching. The theoretical framework is designed to explain the online learning system using Semantic Web technologies, after problem identification, Practical implementation phase evaluated during the experimental phase. We made face-to-face, questionnaires and telephone interviews with members of relevant organization's and committees in seaports and trade domain (customs, port authority, agency, and shipping lines) as methods of Data Collection

3. BACKGROUND AND LITERATURE REVIEWS

Online learning using semantic web

Nowadays Online learning systems are usually used by a wide variety of online learners with different preferences, background, needs skills and preferred learning styles. Online learning has extremely beneficial in providing cost-effective education irrespective of geographical boundaries and time [7] [8] [9]. Although, Classical online learning systems have several following problems [10]. The problem of Searching time for the right learning materials, Learning materials deliver flexibility problem, Absence of personalization, online learners with the same plan have the same content lists for learning, even though they have different previous knowledge about their plans and different personal preferences. And there is a weak search technique for searching the learning objects (LOs). On one hand, it is difficult to find appropriate learning materials according to the leaner's request with the absence of semanticists [11]. In response to this shortcoming, we propose a new approach to introduce a new entity to e-learning, which is the semantic web, recommendation and adaptive and personalization of the online learning style. Furthermore Semantic web technology and ontology are used to improve online learning systems, in order to share, reuse the information easily and in a personalized and adaptive way [12] [13]. furthermore, online learning using semantic web technologies will help the online learner to find the learning object easily and relatively for their queries and interest [14], therefore, the semantic web technology improve the learning and enhance online learning content [15] [16].

Learning Management Systems LMSs submit the same kind of course structure and LOs to each online learner so it considered as one size fits for all [17]. However, each online learner has different property such as levels of expertise, prior knowledge, learning styles, cognitive abilities and interests, therefore, a (one size fits for all) systems doesn't support online learners to select the learning activities and learning objects LOs that best meet their criteria, knowledge, interests, motivations, needs, objectives and preferences [18]. The main objective of the Semantic Web technology is to describe Web contents in a way that allows not only the human but also the machines to understand and process the web resources [19].

Recommender online learning

the Recommender systems are also known as information filtering systems that assist users in products, contents, or services (such as books, websites, movies, digital products, song, travel destinations and online learning material) by implicitly or explicitly collecting and analyzing preferences from other leaners finding [20]. Also, the mission of recommendation in online learning systems is to give learner personalized and suitable learning materials. As noted earlier, in the existing online learning systems it's very difficult for an online learner to find learning materials that match their needs because of the information overload and sharing problems. Accordingly, the recommendation and personalization approaches allow executing more effective and efficient online Learning processes [21]. Nevertheless, different online learners have his own specific characteristics with respect to their competence level, experience, preferred learning style and activities [22], and ,This makes recommending learning objects to a particular online learner's very difficult task, even if two users have the same evaluations, different recommendations will require if the characteristics of the users are not the same. generally, The main objective of Online learning recommender systems supporting learners during their learning process that fulfill their learning goals [23] By identifying the most appropriate learning objects Los from a potentially massive diversity of choice [24]. Likewise, Online learning Recommendation Systems recommend a wide variety of learning items such as learning objects LOs, learning resources on the Web or on specific domain [25], software, test items, lecture notes, or complete courses. In the effective Training, the fundamental elements are control of trainees' feedback between the trainee and their trainee and his skills. Whereas Recommender systems used to retrieving personalized information and recommend useful materials and learning objects to the Online learners based on their knowledge, interests, motivations, needs, objectives, and preferences [26] [27] [28] [29] [30]. Moreover, Ontologies is used as an approach to Adaptive Personalized online learning System [31].

Furthermore, the learning style is an extremely significant factor that affects the online learning process [32]. Personalized Search Result and learning style in online learning system using semantic web technology can solve these problems and improve Classical online learning systems. To do that, the leaner's profile ontology is compared to some reference properties. These properties originate from the information item in the content-based approach and the leaner's social environment in the collaborative filtering approach. It is also defined as information filtering, that use predefined rules to recommend the training contents to the trainees and filter the information.

Adaptive E-learning

Indeed, since 1990, the area of adaptive online learning systems has received major attention, but have seen rapid development in more recent years. As a developing new learning manner, modern research in the last decade, statistics demonstrated that there is a significant increase of applying adaptive online learning for delivering diverse courses [33], also Personalization and adaptation are supported by many learning theories [34]. Furthermore, Due to different personalities, background, capabilities, needs, goals of an individual online learner, Adaptation is becoming very significant features in online learning systems. Adaptive process refers to the matching of activities and learning materials for different learning styles to enhance learning and benefits to both instructors and learners. Furthermore, an increasing attention, in constructing adaptive online learning systems has led to the development of a many of adaptive models and procedure. For example, Brusilovsky [28] suggest the architecture of an adaptive online learning system (as shown in Figure 1). The adaptive system interferes at three stages through the procedure of adaptation and controls the process of collecting the online learner, adaptation procedure and the procedure of building up the online learner model.
They also indicated that the adaptive system collects learner model information from different sources that can include explicitly requesting input from the learner and implicitly observing learner interaction.

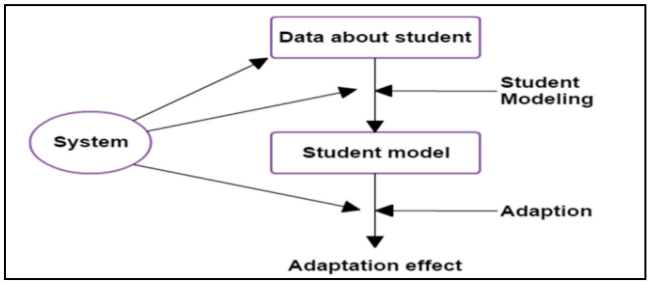

Fig.1. The architecture of an adaptive online learning system

Also, Adaptive Online learning systems attempt to adjust learning content to appropriate the user's needs and interests [35] [36]. Furthermore, online learning are considered adaptive learning system when they can change dynamically to the better suit interests, motivations, needs ,objectives and preferences needs of learners in response to collected information during the course instead of on the basis of preexisting data such as age ,job, gender, or test score [37]. Adaptive online learning is set of techniques oriented to offer online learner a unique and personal experience, with the final goal of maximizing their performance to support online learning in the Workplace for employee and customers in a lot of domains specially seaport domain. Adaptive online learning is based on the principle that every online learner (in our case employee or customers of seaport domain) is unique and has a different background, learning interests, and needs, learning style, etc. [38] [39]. The objective of our Adaptive online learning system is being able to capture those differences and translate them into contents and training processes which are relevant for each and every individual student, based on similarity of the Trainee profile ontology and Training object to determine a more appropriate relationship between them. Thus, it may recommend online learner with the most appropriate learning objects LOs using the semantic similarity [40] [41].

Furthermore, Search for learning contents play a very significant role in finding the required information and learning objects [42] [43]. in addition, adaptive recommendation online learning capable of providing a customized online learning experience, making this experience relevant for the online learner [44], provide the learner as recommendations the best and the relevant learning resources that better fit their preferences and needs [45].

4. METHOD

In this approach we use ontology to represent knowledge about the online learner and learning resources, The designed ontology will be in OWL Ontology Web Language, the developed system will help online learners choose and find learning objects they want to study Based on semantic web technology, and Use of ontology for knowledge representation in knowledge-based recommender systems, using semantic similarity between leaner queries and learning object. Furthermore, we Create the knowledge base using the Resource Description Framework (RDF) framework proposed by the W3C to represent their data, and web ontology language (OWL) to create the ontology, providing adaptive, personalized recommendation for each Online learner. In this paper, protégé is used to develop ontologies in our developed system as ontology editor.

The Domain Ontology

Briefly, the main reason for ontology is to enable communication between computer information systems in a way that is independent of each system. Furthermore, to present both the online learner profile and the learning objects description for certain data structures, the development of ontological models of the online learner and learning materials is required.

Ontology development Methodology: Ontology engineering

Ontology engineering is a subfield of knowledge engineering that studies the methodologies and techniques for building ontologies. We use knowledge engineering technique to build specific domain ontology. The domain of our learning content and the ontology we have developed within the proposed system is online learning in Seaport operations and customs domain. The ontology covers many topics in port operations and trade facilitation like Import, Export; Transit, etc. It is used to index the learning materials and to simplify search based on semantic and re-usability of learning objects. The author in [46] proposes a knowledge engineering approach to create and build a specific domain ontology. we have adopted the seven-step approach that is proposed by Noy and McGuinness [47] [48] as follows:

Step 1. Define the domain definition and the domain scope, covered domain is the seaports and online learner and Learning object domain. The ontology will be used by online learners, users, and domain experts via an interface.
Step 2. The possibility of sharing and reusing the current ontologies is considered, in this step we extract the main concepts from other ontologies according to our needs and interests that will enrich our ontology.
Step 3. In this step, we list the significant keywords of the domain Ontology.
Step 4. We determine the master classes and hierarchy of this class's. We use the ontology model that we have developed to classify the collected keywords from the previous steps according to the following attributes: Author, Title, Description, Publisher, Date, Type, Topics, Language and Keywords.
Step 5-Step 6. Define the classes' properties .the classes' properties and their facets are defined in the designed ontology model level. Each concept in our ontology gets the model class properties which it belongs to.
Step 7. Create the instances: Our ontology concepts represent classes related to the online learning domain. We create another ontology for seaport domain and learning objects. The online learner's model is based on the online learner ontology.

How Blockchain technology is Impacting e-learning systems

However BlockChain principles were first applied in the financial world as the technology that allowed Bitcoin to operate, we think it will have applications for many industries including learning. One of the great challenges of E-learning improvement is creating high integrity, usable, records associated with learner despite their moving through different learning domains and systems. Blockchain offers the chance of creating a reliable place to track the history and changes across systems in a manner that gets around many of the concerns correlating with data integration between all learning systems. In effect, Blockchain becomes the unifying glue that holds together a highly fragmented learners record. In e-learning systems, we talk about Blockchain in terms of its ability to securely, privately and comprehensively track e-learners records. Currently, e-learner's learning history is a puzzle with its pieces dispersed across multiple providers and organizations. One piece is held by your primary learning organization. Several pieces are held by every learning center or authority you have visited throughout your learning life. Another set might be held by other ways. Blockchain could help us assemble all of these pieces in real-time and view the entire picture of e-learner, with the confidence of knowing it's both comprehensive and up-to-date.

5. CASE STUDY - DESIGN AND IMPLEMENTATION OF KNOWLEDGE BASE INDUSTRIAL ADAPTIVE RECOMMENDER ONLINE LEARNING SYSTEM USING SEMANTIC WEB FOR SEAPORTS

In an online learning systems the different learning objects creator use different terminologies and naming when creating the learning objects, in which case the combination and searching of learning objects and course materials becomes very difficult, In this case, Learning materials can be reached only if it's specific the correct title. These naming conflicts can be synonyms, homonyms or polysemy conflicts, this problem is derived from the lack of semantics in the learning content.

Heterogeneity: In general, the information can be presented differently from one information system to another, Furthermore, this naming conflicts and heterogeneity may be synonyms, polysemy or homonyms conflicts as to describe as following.

Synonyms conflict: different words expressing the same information, To give an illustration of what we mean, let's look at the example in seaport community domain the word « Car» and « Land carrier » and « Truck» and « vehicle » are different words referring to the same information.

Homonyms conflict: same word from different origin with the same pronunciation that has different meaning, e.g. in seaport community the word « charge - discharge» if it used in port operation it refers to charge and discharge of cargo and containers from and to the ships but if it used by another filed like electric its refer to Electric charge and discharge.

Polysemy conflict: the meaning of the same word from the same origin changes depending on context. we will describe the general model of the solution in details to understand how smart Search model recommend and retrieve the learning objects. and clarify the developed adaptive recommendation online learning system based on semantic web ontologies. It also describes the individual components needed to implement the approach and the Framework of the personalized learning content adaptation mechanism.

This paper proposes Adaptive Recommendation Online learning using semantic web (ARELSW) system, to address the increasing number and diversity of Learning materials and user requests. The ARELSW can manage efficiently a large number of online learners' requests and smart deliver proper personalized learning content from a Learning Object Repository LOR. Moreover, the ways that learners learn differently from one learner to another, Learning styles help the improvement of the learning content delivery, affect the learning process, useful for personalizing the learning process. The objectives of the developed system are: personalized learning adapted learning materials to the online learner profile, re-utilization of the learning resources and

interoperability with other eLearning systems and seaport operation management systems. The ARELSW includes the following components, as described below:

Personalized Learning Content Delivery Phase: To deliver the suitable learning content efficiently with associated learning objects to online learners is based on the learner priority, knowledge, interests, motivations, needs, objectives and preferences.

Adapted recommend learning materials: the system can change dynamically to the better suit interests, motivations, needs, objectives and preferences needs of learners.

Domain Ontology

Acquiring Online Learner Profile and using the learning style

Design and development of interactive and (RLO) Reusable Learning Objects

Learning objects semantic and personalized Search: The Learning objects Search model is an example of search based on semantic engine and semantic agent.

The proposed model will effectively help learners to find correct LO based on the semantic query. Which are implicitly and seamlessly injected into both online leaner query and LO Search concepts stored in Resource Description Framework (RDF), Contrast with the classical query which depends on keywords only, and not their meanings. The LO Search model is composed of two tiers, with each tier is responsible for the specific task. The tier may be composed of multiple components

The presentation tier

This tier displays information related to LO search query and answers. it contacted with the other tiers by outputting the outcomes to the browser/client tier and all other tiers in the network.

The business logic tier

Controls the functionality of the application by performing detailed processing, handling the transformation of the input text, and information exchange between (RDF) data, the knowledge base (ontology) and the leaner interface. It Consisting of A group of agents that interact together to achieve a specific complete task related to a specific seaport Training LO Search domain. it consists of 4 components :

1-The stop words removal component (query filtration)

When the leaner enters her /his query in the text area, he may enter other special characters such as punctuation marks. Query filtration component is responsible for filtration of all punctuation marks and special character. Furthermore, the query words are separated by Stop words like: with, if, on, from, or, the.

2-The word analysis component

it is the first semantic component that lists the words in the leaner query. And fetches their references or different meanings, by referring to predefined WordNet ontology for seaport domain and learning objects terms and axioms used in any search domain. In this case, we use the seaport domain ontology. Furthermore, Different word-sense disambiguation (WSD) algorithms can be plugged there. Knowledge retrieval: an input query is annotated according to learner profile and interest then by using ontology, semantically relevant information is retrieved

3- The Query Library instance construction component

As the user query is normalized, another component starts the work of constructing anonymous domain instance that represents this user query in order to be matched against stored Learning Objects LO names instance in the knowledge base (RDFs).

4-The Library core processor component

This component performs multiple operations. Including indexation, preparation of Los, ontology matching, And finally sorts the result according to their needs and the interested data field as shown in Figure 2.

Asking for Explicit category method

In case of Homonyms conflict: same word from different origin with the same pronunciation that has the different meaning. In this paper to overcome Homonyms conflict and cold-start online learner issue and make a quick profile of a new online learner, we propose methodology (Asking for Explicit category) is to ask for straightforward selection by presenting items to the online learner. It can get quick information about the online learner with a quick and short list, That the online learner has to explicitly specify these preferences or that the system has the ability to infer them through a monitoring process (search history, logs, learner profile .etc.), After presenting some items to the online learner and the user select his main category, the result will appear according to his category, and finally sorts the result according to their interested data field.

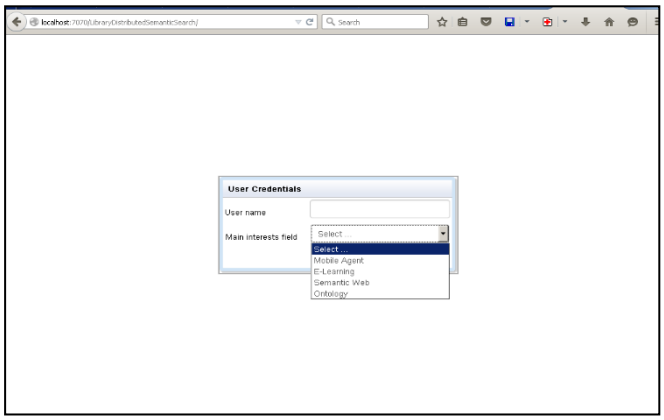

Fig 2 Asking for Explicit category and interested filed

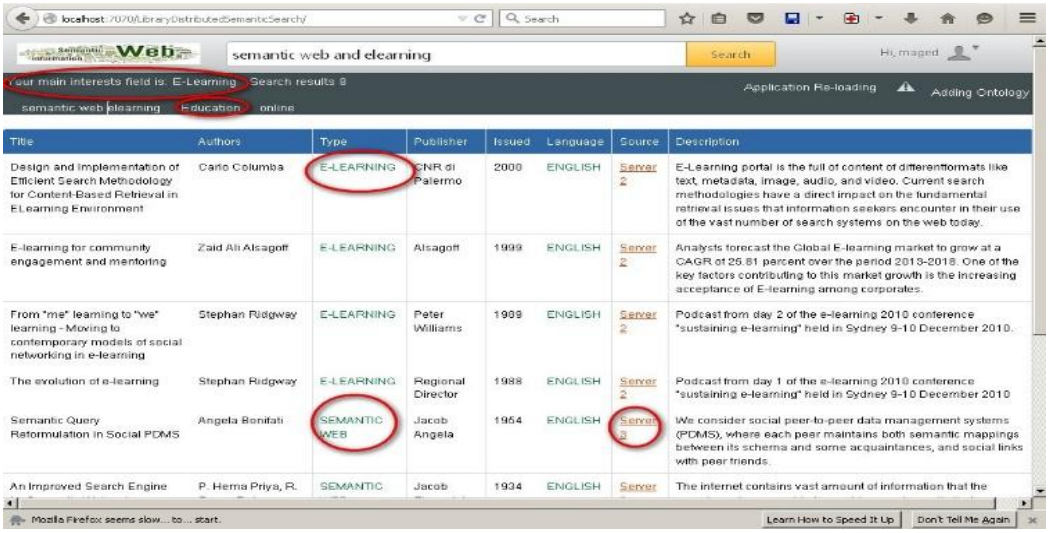

Fig 3.Sample answer to the leaner query, with Online learning as main interested filed

Our new semantic search algorithm will be processed semantically to get proper recommendations of Los It consists of the following steps:-

Step 1. The online learner searching for Los by expresses his need using his own words to form a request (free text query).

Step 2. Then the query is analyzed to check the syntax in order to make sure that the query is well-formed

Step 3 first it tries to disambiguate word senses by using classification algorithms.

Step 4. If the single definition is found, then it processes this definition otherwise it pops up a window proposing the other word meaning to the leaner, with the facility to let online leaner select another meaning. for example in seaport community the word « charge-discharge» if it used in port operation it refers to charge and discharge of cargo and containers from and to the ships but if it used by another filed like electric its refer to Electric charge and discharge as shown in Figure 2

Personnel knowledge search engine personalizes knowledge according to online learner profile and support to search learning objects appropriate for leaner, The Trainee of web-based training systems in seaports domain belong to different categories based on their skills, background, preferences and learning styles and job file. We focus on personalized search based on semantic and recommending learning content material and type that are appropriate to the learning environment, In this component, online learner's interests and needs will be processed semantically to get proper recommendations of Los.

Ontology enrichment tool

In our proposed Adaptive Recommendation E-learning using semantic web (ARELSW) system provides an ontology enrichment tool in which it enriches the ontology with new concepts from The list of the concepts that are requested by the Online learner but not included in the domain ontology ,the system provide system administrator with a tool they can use it to edit current ontology and add new concepts.

Developed System Feature

The features of the developed system include:-

1. Personalized Learning Content Recommendations: the learning process take into account the online leaner's preferences and personal interests and needs. And understand educational needs, knowledge, interests, motivations, objectives, and preferences.
2. Adaptive learning content, maximize online learners' performance and increase motivation by considering that every online learner has different knowledge, educational needs and learning style(which defined as the way learner prefer to learn i.e. Sensing vs. Intuitive or Visual vs Verbal or Active vs. Reflective or Sequential vs. Global) for example: the following is Example of rules used to adjust online learner learning style If learning style (online learner)= "visual " Then show learning content with video and pictures modes and sort the search result to Appear in the top of result page content with picture sequence with an example followed by links to presentation and interactive simulation. Else if the learning style (online learner) = "verbal" Then apply learning content with text modes If learning style (online learner) = "sequential " Then apply learning content with details modes
3. Adaptively: The leaner's preferences change over time and the system tracks them and properly adjust to them. We take into consideration not just the leaner's recent actions but all history of the user learning behavior And Capitalize the LMS investment and ROI while adding adaptive capabilities to the online courses. And Maximize learning performance.
4. Extensibility: the Online learning system is extensible in terms of the learning material and learning objects it provides. It's easy for the system to incorporate new courses and learning resources. And improve the quality and effectiveness of the learning materials.
5. Interoperability: online learning system able to access content from and provide content to online learning systems and other digital libraries and information systems (Semantic Web: Semantic Integration and Interoperability of heterogeneous data sources)

6. EVALUATION

evaluation experiments proceed in order to assess how personalized recommender e-learning system fits specified requirements. And these requirements lead to the evaluation goals. The 3 categories of evaluation goals for Online learning recommender systems using the semantic web are Measuring Performance of Recommender System, User-Centric Effects Measuring and Effects on learning Measuring [49].

Moreover, the evaluation was designed and applied to evaluate the entire adaptive e-learning recommender system using the semantic web.

The methodologies for the evaluation of online learning recommender systems According to [50] and [51] can be classified into 3 types: 1- real-life testing 2- user studies, 3-offline experiments, Each methodology of this evaluation has its advantages and disadvantages and may be better appropriate to evaluate certain goals than others in this paper us user studies, and real-life testing to the Parties Involved in the Importation of Goods in Import Process Sequence Flow For Importation in Egypt.

User Studies

A user study is a scientific method used to find out how a recommender system influences a learner's experience, perception, and interactions with a system [52]. learner studies cover a wide range of evaluation questions, however, these are very subjective judgments .in this research A learner experiment executed by asking e-learner to perform some tasks in a controlled environment for a short period of time. At the same time, the interaction behavior of the employee with the adaptive recommender system is observed and recorded. For example, the time is taken to complete a task (in our case Truck cycle and ships dual time) and the quality of the results of a task. Learners are asked questions before, during and/ or after the experiment. Such questions prepared as a questionnaire and asked in an interview, help to capture aspects that cannot be directly observed otherwise, such as how the user feels about using the system. Participants in a user study should generally be unbiased users of the system and need to be selected randomly from a representative population sample from the Parties Involved in the Importation of Goods in Import Process Sequence Flow for Importation in Egypt.

Real Life Testing

In real life testing, also known as online evaluation, real learners use the system under normal conditions over a long period of time. This might be as a field study where a large community of learners is observed while using the system under realistic conditions or as a pilot study where a system is deployed in its real-life setting. With real-life testing, most user-centric goals can be effectively evaluated such as measuring user experience or user satisfaction.

7. RESULT AND DISCUSSION

Online learning courses offer obvious advantages for Trainee by making access to Training resource just-in-time, very fast, and relevance, we present in this paper approach for design and implement a Semantic online learning system, which focuses on OWL ontology language and Resource Description Framework (RDF) data model.

We demonstrate the effectiveness of this approach through several experiments using the different type of courses taught in the seaport and logistics domain at Damietta port.

In this paper, the adaptive and personalized online learning system, based on innovatory technologies semantic web and ontologies, makes it possible to continuously adapt this form of learning to the actual needs of the seaport operation and management system. Furthermore, it also makes it possible for the online learner to acquire the required knowledge in an operational system that leads to

professional competence in the field. The aim of the personalized learning program is to allow every employee and customers in the seaport system to go deeply into their knowledge about the seaports and logistic domain, about smart port operation services management as well as to long-life learning , that leads to purposes Optimize trade facilitation management and security control and Reduce cost and complexity of trade by simplifying and harmonizing business process to enhance country's competitiveness and Improve revenue.

In this paper, we present our work on creating an online learning system using Semantic Web technologies in the online learning on seaports domain that demonstrates a range of advantages from working with the Semantic Web, semantic search, recommendation and adaptive learning.

Our contribution is to show how online learning system using Semantic Web technologies could be applied to the seaports domain, deliver the learning contents to the online learner in flexible, interactive, and adaptive way and identify the interest, needs, and media to learn i.e. video, Audio, PDF and other, knowledge level, background, profile, search history of the online learner before delivering the online learning resource outcomes to e-learner.

Exactly identifies the actual requirements of online learner and produce only such relevant learning resources to online learner The main concept in the developed approach is that discovering, categorizing, identifying, and presenting the relevant outcomes to the online learner is performed by the machines, not the human.

The semantic and personalized search of the Training contents is based on matching the trainee profile and training object to determine a more appropriate relationship. So, it will advise and recommend trainee with the most appropriate training objects using the semantic similarity to retrieve semantic matched training objects.

The knowledge base is created using the Resource Description Framework (RDF) proposed by the W3C to represent their data and ontology is used to represent knowledge about the Online learner and learning resources.
This study provides a theoretical framework for building an adaptive recommendation online learning system.
This paper makes a significant contribution to the literature with empirically examine the learning Satisfaction and Effectiveness towards the personalized adaptive recommendation online learning system using the semantic web.

Our Adaptive Recommendation e learning System ARELS attempt to adapt learning content to suit the interests and needs of the Online learners using the system. ARELS can dynamically change to better suit the learning in response to information collected during the running of the course of learning basis of preexisting information such as Online learner 's gender, age, job, or achievement test score.

This paper aims to provide an architecture that integrates the different personalization factors for effective search through the learning objects repository.

8. CONCLUSION

In this paper the knowledge base is created using the RDF framework proposed by the W3C to represent their data, ontology is used to represent knowledge about the trainee and training objects. This research builds on existing knowledge in the fields of E-learning, semantic web, recommendation and adaptive learning and applies this system in seaports domain.

Furthermore, the response time of requested learning objects and information can significantly impact and influence the online learning performance. In this paper, we design and implement an online learning system based on Semantic Web technologies that allow to automatically control Online learner s' acquired knowledge in online learning system to enhancement lessons content by Enhancing learning objects and learning materials. to support personalization in the online learning system, recommender systems are used to assist online learners in finding the appropriate learning objects. Personalization involves choosing an appropriate learning approach, depending on the learning style and approach for choosing the appropriate content.

The purpose of our proposed online learning content Recommender Systems is to help trainee in the port community to find not just Learning objects Los but also the type of Los that they should appreciate from a lot of LO content and types to solve traditional learning problems.

Our main contribution is a new technology and method that uses Semantic Web techniques to extend the online learning courses content. This technology allows to enhance learning content and learner style, support the increment of courses pedagogical effectiveness. Designing online learning system using semantic web technology enhances the learning and training process in a dynamic and effective way. And solve traditional e-learning problems like course naming and learning style. In the future work, we will improve the keyword clustering algorithm. Furthermore, we will develop a reference ontology using the agent system, and then assess the impact of agents on the personalized adaptive recommendation system. And we will use Blockchain technology in the e-learning system.

REFERENCES

[1] G. Fischer, "User Modeling in Human-Computer Interaction," User Modeling and User-Adapted Interaction, pp. 65-86, 2001.

[2] Wei and Min, "Research of Ontology-based Adaptive Learning System," International Symposium on Computational Intelligence and Design, pp. 366-370, 2008.

[3] H. Knublauch, D. Oberle, and P. Tetlow, "A Semantic Web Primer for Object-Oriented Software Developers," W3C, 2017. [Online].

[4] S. Decker, S. Melnik, F. Harmelen and D. Fensel, "The Semantic Web: The Roles of XML and RDF," IEEE internet computing, vol. 4, no. 5, p. 63, 2000.

[5] D. F, H. Ian, V. Frank, M. Deborah and F. Peter, "OIL: Ontology Infrastructure to Enable the Semantic Web," IEEE Intelligent Systems, vol. 16, no. 2, 2001.

[6] S. Sendhilkumar and T. Geetha, "Architecture for effective personalized web search," International Journal of Computer Applications in Technology, vol. 35, no. 2, 2009.

[7] M.-L. Hung and, C. Chou, "Students' perceptions of instructors' roles in blended and online learning environments: A comparative study," Comput Educ, vol. 81, pp. 315-325, 2015.

[8] Y. M. Cheng, "Antecedents and consequences of e-learning acceptance," Information Systems Journal, vol. 21, pp. 269-299, 2011.

[9] J. L. Chen, "The effects of education compatibility and technological expectancy on e-learning acceptance," Comput. Educ, vol. 57, no. 2, pp. 1501-1511, 2011.

[10] P. Kumar Tiwari, J. Choudhary, and D. Singh Tomar, "A Survey on Semantic Web-based E-learning," International Journal of Computer Applications, vol. 95, no. 21, p. 0975 – 8887, 2014.

[11] S. R. Linta, M. M. Islam and M. R. Islam, "An Enhanced Model of E-Learning Management System Using Semantic Web Technology and Development of Universal Namespace for University Domain," International Journal of Computer Science Issues, vol. 9, no. 2, 2012.

[12] B. Yevgen, B. Hamidreza, B. Igor and F. Michael, "An adjustable personalization of search and delivery of learning objects to learners," Expert Systems with Applications, vol. 36, no. 15, pp. 9113-9120, 2009.

[13] V. Dagiene and D. Gudoniene, "The Integrated Environment for Learning Objects Design and Storing in Semantic Web," International Journal of Computers, Communications & Control (IJCCC), vol. 13, no. 1, 2018.

[14] G. Shrivastav, K. Sharma and A. Bawankan, "A new framework semantic web technology based e-learning," in In Environment and Electrical Engineering(EEEIC), 2012.

[15] A. Gladun and J. Rogushina, "An application of intelligent techniques and semantic web technologies in e-learning environments," Expert Systems with Applications, vol. 2, no. 2, pp. 1922-1931, 2007.

[16] H. García-González and J. Emilio Labra Gayo, "Enhancing e-Learning Content by Using Semantic Web Technologies," IEEE Transactions on Learning Technologies, vol. 10, no. 4, pp. 544 - 550, 2017.

[17] S. Shishehchi, S. Banihashem, and N. Zin, "Review of personalized recommendation techniques for learne in e-learning systems," in International Conference on Semantic Technology and Information Retrieval, Putrajaya, 2011.

[18] P. M. Achar, "Creating an Advanced Web-Based Environment Using Semantic Web," International Journal of Management, Technology, and Social Sciences (IJMTS), vol. 2, no. 1, 2017.

[19] T. Berners-Lee, J. Hendler, and O. Lassila, "The Semantic Web: A new form of Web content that is meaningful to computers will unleash a revolution of new possibilities.," Scientific American, 2001.

[20] H. Drachsler, H. Hummel, and B. den Berg, "Recommendation Strategies for E-Learning: Preliminary Effects of a Personal Recommender System for Lifelong Learners," 2017.

[21] M. Gaeta, S. Miranda, and F. Orciuoli, "An Approach To Personalized e-Learning," SYSTEMICS, CYBERNETICS AND INFORMATICS, vol. 11, no. 1, 2013.

[22] J. Buder and C. Schwind, "Learning with personalized recommender systems A psychological view," Computers in Human Behavior, vol. 28, no. 1, p. 207–216, 2012.

[23] H. Drachsler, K. Verbert and O. Santos, "Panorama of recommender systems to support learning," in Recommender Systems Handbook, Springer, 2015.

[24] K. Verbert and N. Manouselis, "Context-Aware Recommender Systems for Learning: A Survey and Future Challenges," IEEE Transactions on Learning Technologies, vol. 5, no. 4, pp. 318-335, 2012.

[25] G. Hoppe and M. H. Breitner, "Business Models for E-Learning," in E-learning, models, instrument, experiences, of the Multikonferenz Wirtschaftsinformatik, Essen-Germany, 2004.

[26] V. A. Silvana and I. A. Gabriela, "User Recommender System Based on Knowledge, Availability, and Reputation From Interactions in Forums," IEEE Revista Iberoamericana de Tecnologias del Aprendizaje, vol. 11, no. 1, pp. 18-22, 2016.

[27] A. Fabian, I. I. Bittencourt, and E. Costa, "Recommendations in Online Discussion Forums for E-Learning Systems," IEEE Transactions on Learning Technologies, vol. 3, no. 2, pp. 165 - 176, 2010.

[28] S. Jun-Ming and S.-S. Tseng, "A personalized learning content adaptation mechanism to meet diverse user needs in

mobile learning environments," User Modeling and User-Adapted Interaction, vol. 21, no. 1-2, p. 5–49, 2011.

[29] F. Isinkaye, Y. Folajimi and B. Ojokoh, "Recommendation systems: Principles, methods, and evaluation," Egyptian Informatics Journal, vol. 16, p. 261–273, 2015.

[30] S. Oufa, M. Abd Ellatif, and S. Yehia Helmy, "A proposed paradigm for smart learning environment based on semantic web," Computers in Human Behavior, vol. 27, pp. 796-818, 2017.

[31] M. Rani and R. Nayak, "An Ontology-based Adaptive Personalized E-learning System, Assisted by Software Agents on Cloud Storage," Knowledge-Based Systems, vol. 90, pp. 33-48, 2015.

[32] D. Vassileva, "Adaptive e-learning content design and delivery based on learning styles and knowledge level," Serdica Journal of Computing, vol. 6, no. 2, p. 207–252, 2012.

[33] E. Popescu, "Adaptation provisioning with respect to learning styles in a web-based educational system: an experimental study," Journal of Computer Assisted Learning, vol. 26, no. 4, p. 243–257, 2010.

[34] F. Coffield, Should We Be Using Learning Styles? What Research Has to Say to Practice, London: Learning and Skills Research Centre, 2004.

[35] C.-H. Wu and Y.-S. Chen, "An Adaptive e-Learning System for Enhancing Learning Performance: Based on Dynamic Scaffolding Theory," EURASIA Journal of Mathematics, Science, and Technology Education, vol. 14, no. 3, pp. 903-913, 2017.

[36] F. Mödritscher, Adaptive e-learning environments: theory, practice, and experience, VDM, Müller, 2008.

[37] I. Torre, "Adaptive systems in the era of the semantic and social web, a survey," User Modeling and User-Adapted Interaction, vol. 19, no. 5, p. 433–486, 2009.

[38] P. Brusilovsky and M. Maybury, "From adaptive hypermedia to the adaptive web," Communications of the ACM, vol. 45, no. 5, pp. 30-33, 2002.

[39] H. Drachsler, H. Hummel, and R. Koper, "Identifying the goal, user model and conditions of recommender systems for formal and informal learning," Journal of Digital Information, vol. 10, no. 2, pp. 4-24, 2009.

[40] B.-d.-T. Jose M, A. F. Jesus and L. C. Vicente, "A semantic similarity measure in the context of semantic queries," International Journal of Computer Applications in Technology, vol. 33, no. 4, 2008.

[41] S. Poomagal and T. Hamsapriya, "Semantic similarity-based PageRank using wordnet," International Journal of Computer Applications in Technology, vol. 46, no. 2, 2013.

[42] K. Igor, L. Natalya, and M. Sergiy, "Personalized Distance Learning Based on Multiagent Ontological System," in Proceedings of the IEEE International Conference on Advanced Learning Technologies, 2004.

[43] M. E. Jianu and A. Vasilateanu, "Designing of an e-learning system using adaptivity and gamification," in IEEE International Systems Engineering Symposium (ISSE), Vienna, Austria, 2017.

[44] Y. Tzitzikas and D. Kotzinos, "(Semantic Web) evolution through change logs: Problems and solutions.," at the IASTED International Conference on Artificial Intelligence and Applications, 2017.

[45] K. Halimi, C. Faron-Zucker and H. Seridi-Bouchelaghem, "An enhanced personal learning environment using social semantic web technologies," Interactive Learning Environments, vol. 22, no. 2 I: Special Issue: Learning management system: evolving from silos to structures, 2014.

[46] H.-y. Yun and X. Jian-liang, "Development of Domain Ontology for E-learning Course," in IT in Medicine & Education, 2009.

[47] N. Noy and D. McGuinness, "Ontology development 101: A guide to creating your first ontology," Knowledge Systems Laboratory, Stanford University, 2001.

[48] R. Bansal and S. Chawla, "An approach for semantic information retrieval from ontology in computer science domain," Perspectives in Science, vol. 8, pp. 330-333, 2016.

[49] M. Erdt and A. Fernández, "Evaluating Recommender Systems for Technology Enhanced Learning: A Quantitative Survey," IEEE Transactions on Learning, vol. 8, no. 4, pp. 326 - 344, 2015.

[50] N. Manouselis, H. Drachsle and K. Verbert, Recommender Systems for Learning, New York, NY, USA:: Springer, 2013.

[51] G. Shani and A. Gunawardana, "Evaluating recommendation systems," in Recommender Systems Handbook, New York, NY, USA, Springer, 2011, pp. 257-297.

[52] B. Knijnenburg, "Conducting user experiments in recommender systems," in 6th ACM Conf. Recommender Syst, 2012.