



Bridging Ontologies and Patterns to Overcome Socio-Cultural Lags

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Abstract— *Information and Communication Technologies (ICT) adoption is not simple for a huge part of population in Africa and Asia, particularly for women. We noticed they cannot access to ICT for many reasons such as poverty, cultural barriers, illiteracy, lack of emancipation, etc. For all those reasons, we are involved in a research project which aims to help handicraft women from Maghreb to use new technologies to develop their business and to increase their creativity. Faced to huge socio-cultural barriers, we observed socio-cultural lags and we proposed specific solutions to allow the handicraft women from Maghreb adopting new technologies. Some proposed solutions are specific teachings/trainings which are offered by specialized educative teams using technical platforms based on ontologies and patterns. Thus, the teaching solutions are adapted accordingly to context and social profile of each of the handicraft women.*

Keywords— *ICT; Context; Socio-cultural profile; pattern; Socio-cultural lags; Teaching; Trainings; Ontologies.*

I. INTRODUCTION

To make technologies adopted by any individual is a still ongoing research area [10][16]. This belongs to a research domain called Social Construction Of Technology (SCOT) [12][15] and which recognizes that technology usage is heavily influenced by its social context, and it is the product of inter-group negotiations. Moreover, Ogburn in [13] suggested that technology is the primary engine of progress, but tempered by social responses to it. He defines cultural lag as a common societal phenomenon due to the tendency of material culture to evolve and to change rapidly and voluminously while non-material culture tends to resist change and remain fixed for a far longer period of time. Due to the opposing nature of these two aspects of culture, adoption of new technology becomes rather difficult. Researches on Information and Communication Technologies (ICT) adoption in Africa and Asia-Pacific suggest that there are serious barriers to their use in educational and socioeconomic development, such as issues of infrastructure support, access to ICTs, training and skills development, and hierarchical social relations which determine who has access to ICTs. So, ICT and teaching were used in many applications such as in [9] where they are considered as a genuine mean to disseminate vital best practices. Faced to the lacks of ICT adoption, researchers proposed teaching solutions some based on e-Learning. e-Learning involves the use of a computer or electronic device (e.g. a mobile phone) in some way to provide training, educational or learning material. e-Learning systems gather two separated and distributed parts as: authoring tools (for pedagogical contents and scenarios' design) and execution platforms [19]. However, E-Learning platforms show some limitations such as: 1) A myopic vision of context which limits auto-adaptability strength, 2) The teacher suffers from the lack of interactions with learners who are focused on their computers, 3) Socio-cultural aspects are not taken into account, 4) The approach is elitist because learners are supposed to know how to read and how to write, ready to communicate, open to new technologies, 5) Learner's creativity is not on the agenda, etc.

To attempt to give solutions to those problems, we are involved in a research project studying the manner handicraft women in Tunisia and Algeria use new technologies such as: Internet and social networks with different devices as phone, smart phone, laptop, tablet, etc, to develop their creativity and their business activity. Based on previous observations and after having interviewed several handicraft women, we noticed cultural gaps are so important that we wondered if ICT can be adopted by any individual. Is poverty the one and only reason so many people of under developed and emergent countries do not use ICT? We believe socio cultural reasons slow up the ICT using process as mentioned in [18] [21] [22]. Authors in [11] also recommend that school administrators work closely with teachers to address their beliefs and concerns about technology adoption and provide an influential level of personal support and resources. We aim to use these results to define our proposal.

This paper is structured as follows. Section 2 explains the project approach and it includes the classification of the handicraft women. Section 3 presents related works. Section 4 proposes the different proposed ontologies and patterns. Section 5 shows an implementation of our work. Section 6 presents future works, and in section 7, we conclude.

II. DESCRIPTION OF THE PROJECT APPROACH

A. The Approach

We propose to manage this study in two main phases. The first phase addresses a little number of women (about 120). It aims to understand women's habits, to propose initial solutions, to test them and to decide for a final orientation. Based on the results of the first phase, the second phase will study a larger number of handicraft women (about 500), and will aim to consolidate and refine results with a concrete finalized tool based on social Web Mining and auto adaptation.

So, the first phase of our approach is also based on different steps according to figure 1. On start-up, a set of women are selected by association members, they are interviewed and observed during their activity (step 1). Knowledge is manually modeled as ontologies with axioms and inferences (step 2). All the information concerning interviewed women is stored by sociologists. Pre-solutions and advices are proposed to train women (step 4). Then system is launched, and automatic decisions are proposed by the system as follows. Specific spyware and indicators inform about the manner handicraft women use ICT during their activity and their improvements (step 5). Each new information is stored (step 6) and analyzed at run time (step 7), and generates decisions immediately concerning training strategy adaptation, and devices to propose to women concerning pedagogy (step 8). Context, profile, skills are updated, and training as a service is sent to the learner's device. This training can be a new training process which is uploaded according to learner's profile, or a set of parameters impacting training (step 9). Training and new training strategy can be uploaded on Smartphone or on laptop (step 10). Thus, the iterative proposed approach consists going on observing and analyzing the women business activity and proposing new suitable strategy. The pedagogical team has to assist learners with a more important assistance rate for inland women.



Fig. 1. General Process

B. The Handicraft Women

The interviews allow us classifying 120 handicraft women from different Tunisian and Algerian regions into four groups as mentioned [6]:

- *Inland Handicraft women* are mostly coming from poor social background and they have the duty to stop studying early to financially help their family. They are divided into two groups namely class A and class B. More than forty years old women (class A) mostly are illiterate housewives stuck at home with at least three children. Husbands mostly are unemployed and they rarely help their wives. They deal with re interpreted Islamic rules and gossips which force them to be under the domination of their husbands, to stay at home and to limit external communication specifically with men. Simply using a mobile phone might be seen as an emancipation act. So, very often, husbands use phone instead of their wives. They work hard and have no time to watch TV or receive information. In general, daughters want to stop studying to help their mother but they easily use phone and Internet for chatting and using Face Book or else. Some others, class B, are not illiterate, they were school-leaving before twelve, they use telephone to call providers, partners and clients, they are too poor and too isolated to access Internet and Social Networks, they have difficulties to write and read. The youngest women are more influenced by media so ready to use technologies.
- *City-dweller women* have diploma such as baccalaureate or masters from fine-art Universities. We classified them as following. Class C left school before twenty years old; they use telephone, Internet and Social networks. Some learnt their job with apprentices and trainings and they developed their own techniques. Class D comes from well-off middle class, they went to art school and/or to the university, some went in Europe (France) to learn with professionals. They are all married after the age of twenty two. Their husbands also come from middle-class, they are executives, or free-lance, etc. They have one or two children. They are Muslim, but not traditionalist, without any distinguishing features. They use new technologies to contact clients and providers. Some women with highest purchasing-power financed a commercial Web site to present and to sell their production. They have contacts abroad to sell their products. They usually use Social Networks and Internet. They all at least speak fluently three languages as: Arabic, French, and English. They can delegate to women of classes A, B and C some parts of the production process.

C. Ogburn's Lags with Proposed Solutions

Socio-cultural lags defined by Ogburn in [13] are critical for inland women, women from classes A and B refuse to be trained even if they agree on the fact ICT can be helpful. Other women from classes C and D accept trainings without any condition. We observe several main socio cultural lags which reduce the adoption of ICT for inland women essentially:

- 1) Women of classes A and B are *poor*, they have the lowest standard of living. Poverty can be balanced by free means to contact clients, providers, partners, etc. ICT are available in town halls and free transportation means are offered. Meeting other women and professional is the opportunity to contact providers, clients, etc and to negotiate prices, but also to develop creativity
- 2) *Illiteracy* is noticed for classes A and B and it can be fought using: learning prerequisites such as writing and reading trainings, collaboration and interactions between different learners (handicraft women) and a relevant pedagogical team.
- 3) *Isolation lag* (classes A and B) can be solved with free communication means in Town Halls in each village and with free transportation means (bus, collective taxis, etc).
- 4) *Family burden* cannot be easily solved. Simple solutions can be based on solidarity between women in the same village and family members for babysitting, for watching over animals, etc. It can be interesting to include in the training groups children (between eight to eighteen), it is a manner to reassure women and to make children and teenagers aware of technologies benefits. We every time met motivated women but they prefer being replaced by their children so it is important to convince and to motivate them to be trained. The pedagogical team has to persuade women and husbands too, by showing, for instance, the financial benefits for all the family.
- 5) Till now, *religion* by itself is not a constraint for women, gossips and cultural habits prevail over Islamic rules. Governments defined constitutions to limit the influence of Islamic rules to model on Occidental democracies.
- 6) Inland people are obsessed with *gossips* which keep them hostage reducing their freedom. They fear not to follow up expected code of behaviour and to be excluded from their community. Everybody spies the other and tries to catch any indiscretion which will be disseminated in café by men. Training program must be approved by authorities and be supported by famous non lucrative associations.
- 7) *Socio-cultural codes* force Inland women on staying at home. They do not manage money, only husbands are supposed to make simple financial transactions. Credit cards and bank check are abstract concepts and which are rarely used. These habits reduce *emancipation*. So, husbands have to be persuaded that women can have a banking account and can manipulate money, virtually or not.
- 8) *Government gave up* inland women and women from poor district. *Political instability* had a strong impact on tourism which reduced more than 40%. The instability and unemployment had the consequence to increase non respect of laws and misogyny. We propose virtual transactions and to use the non lucrative associations as intermediaries. We also propose free services of professionals, lawyers, medicine men, accountants, etc, with free transportation means.

III. RELATED WORKS

Most research works have been developed in the context of companies, they focus on the user acceptance of technology as mentioned in [3]. Although many models have been proposed in companies to explain and predict the use of a system. The Technology Acceptance Model (TAM) [17] has been the only one which has captured the most attention of the Information Systems community. The different lacks of TAM allowed defining a unified model, called the Unified Theory of Acceptance and Use of Technology (UTAUT), with four core determinants of intention and usage, and up to four moderators of key relationships [1][22]. In this approach, social influence is defined as the degree to which an individual perceives that important others believe he or she should use the new system [2]. Another application of these models was proposed by [4] in the use of ICT in water treatment, which includes the impact of important moderating influences (which affect the degree to which each of the key influences predicts adoption) such as: voluntariness of use (i.e. whether adoption of the new technology is voluntary, or compulsory as it may be for professionals within a work context); experience (of the technology); gender; and age. Other studies driven in the USA [5] or in Brazil [20] noticed age, education, income and race are associated differentially with certain beliefs about the Internet, and that these beliefs mediate consumer attitudes toward and, ultimately, use of the Internet. Social Learning models are proposed as “learn by doing” and “learn by the others” to measure the impacts of these models on the ICT acceptance, without including socio-cultural lags which are not major parameters in the industrial context in industrialized countries. However, Handicraft Women do not belong to a community and they are linked to a socio-cultural context which is still not taken into consideration by previous researchers.

To conclude this section, in this paper we study a population which has never been studied before and we propose four major advances: 1) the link between socio-cultural lags, context and training strategy, 2) a definition of context including profile and skills, 3) a technical implementation based on J2EE platform, 4) by implementing several expertise as sociology, training, business, etc, we aim to define a manner to automate analysis, socio-cultural advices, training organization and deployment of a suitable training strategy according to socio-cultural profile.

IV. ONTOLOGIES AND PATTERNS BASED PROPOSAL

A. Examples of patterns

According to [4], we classified ontologies in different layers, but, in this paper, we propose some examples of patterns we implemented in our system. Patterns 1 and 2 generate socio-educative patterns, patterns 3 and 4 can lead to different and necessary advices automatically proposed by the system.

Pattern 1:

If Handicraft woman belongs to class A and B then

(Socio-cultural lags are: Poverty, Illiteracy, Family burden religion, gossips, lack of emancipation, Political instability)

And Launch Teaching Strategy (Propose training “Reading and writing” including Learning the basis of reading, witting).

Pattern 2:

If Handicraft woman’s lag is poor with revenue per month less than 10 Euros then

Launch Teaching Strategy ((Propose training “Communication improvements” including Learning the basis of communication, Communicating with a client (Role Play), Communicating with a provider (Role play), Communicating with a colleague)

And (Propose training: “Technologies improvements” including: Using Phone (Role Play and film), Using a laptop, Using Internet, Using Video Conference Tool (Role Play and film), Using Social Networks (Role play), Improving communication, out sourcing and creativity with new technologies)).

Pattern 3:

If Handicraft woman lives inland then

(Pedagogical team proposes free transportation means such as collective bus and taxi, and communicates about this proposal)

And (The team and association members have to inform neighbours about the merits of the approach to prevent from gossip).

Pattern 4:

If Handicraft woman lives inland and has children and is married then

(Pedagogical team and association members have to convince woman and husband: to take a bus or a taxi alone or with children, to leave their home work and their home to go to learn in a public place, to go to a familial meeting.)

In previous works we proposed “advices” during decision process [6]. These advices propose solutions about: how to increase performance, creativity improvement, a suitable manner to use technology, social help as training and organization to deploy and succeed trainings, process improvement with new manners of working as collaborations and crowd sourcing.

B. Examples of Ontologies

We also proposed different training means as social and technical means (figure 2). They are used according to context (represented by CWStructuralEntity class). Several social Means are offered as: professionals (industrial, referent, etc), premise (workshop, school, town-hall), human resources, pedagogical tool, and means of conveyance. Several kinds of software can be used as auto adaptable software which adapt themselves according to context, but also self learning software and pedagogical contents. Human resources are specific to socio-cultural approach, they have a specific background for the project, and they are trained to face to socio-cultural lags. Context dynamically impacts on training means, at run time.

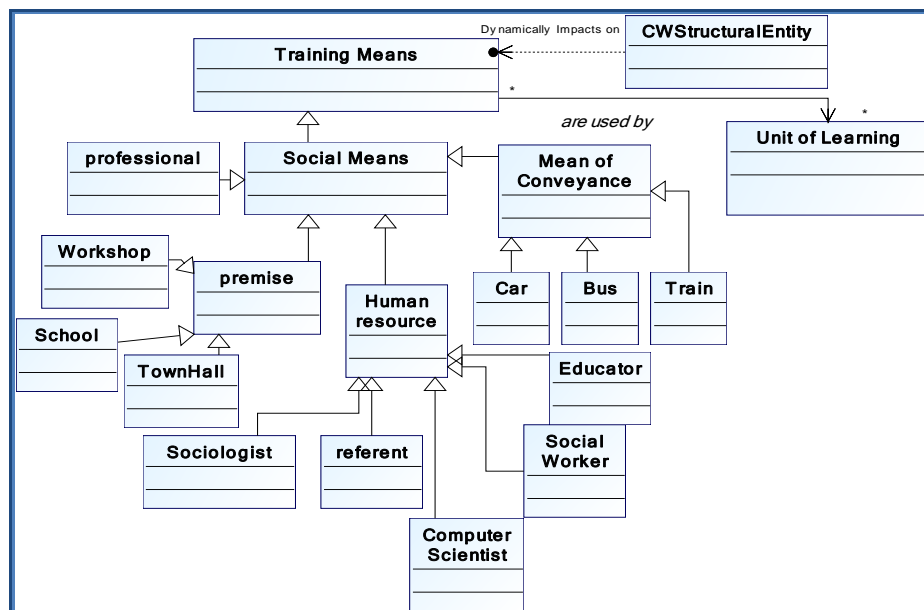


Fig. 2. Training means ontology

We also propose a social based education ontology (Figure 3) using training means, motivation program, training strategy, training organization management, social patterns, interview techniques, and according to a specific context related to an actor (the handicraft woman).

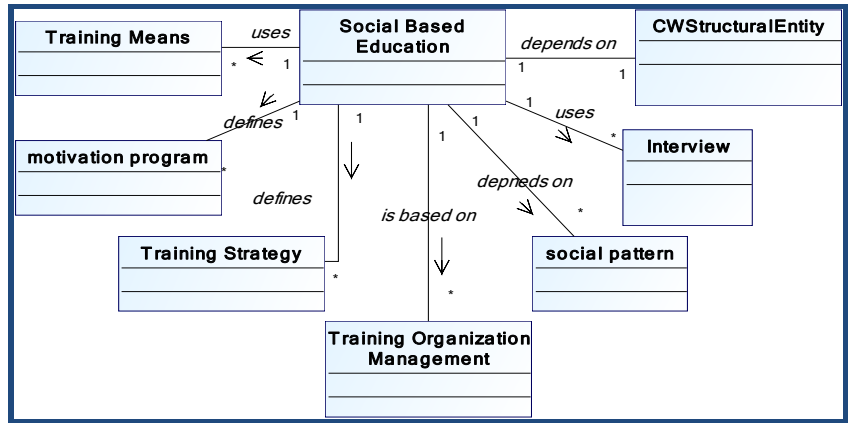


Fig. 3. Social Based Education ontology

V. IMPLEMENTATION

A. Architecture

Our system’s implementation process deals firstly, with the system’s technical architecture proposal and secondly it deals with the implementation of system’s components. So, in this section, we present firstly, the system’s technical architecture. Secondly, we present main implemented components and we focus particularly on ontologies implementation. Thirdly, we will present the manner we have used to exploit proposed components and ontologies to provide the intended solutions. Finally, we illustrate some usage scenarios by presenting some user’s interfaces.

The target system will be used by many kinds of actors as handicraft women, social workers, sociologists, educators, etc. So it should allow seamless and secure access for all those actors. Moreover, it should be enough flexible and interoperable to allow integration or interoperability with other third party systems as Learning Management Systems (LMSs) or social Web sites. Finally, it should be enough portable to allow access to users with several access devices as PCs or handheld devices. All these requirements have oriented our choice to a distributed and multi-layered J2EE enterprise architecture as illustrated by Figure 4. Moreover, this architecture is designed with respect to the Model View Controller (MVC) pattern. So, the first layer represents the presentation or the client layer which could be either Web browser oriented or simply a GUI provided by a desktop client application. The second layer presents the business layer which is implemented by many J2EE components as JavaBeans, EJBs or POJOs. Servlets and JSP pages represent the middle tier between the client and the business layer. EJBs and POJOs make use of the WSML2reasoner API for querying and making inferences over ontologies while some other EJBs make use of WSMO4J API for updating ontologies. Servlets are dedicated to EJB’s business methods invocation and for dispatching the results to JSPs components for presentation issues.

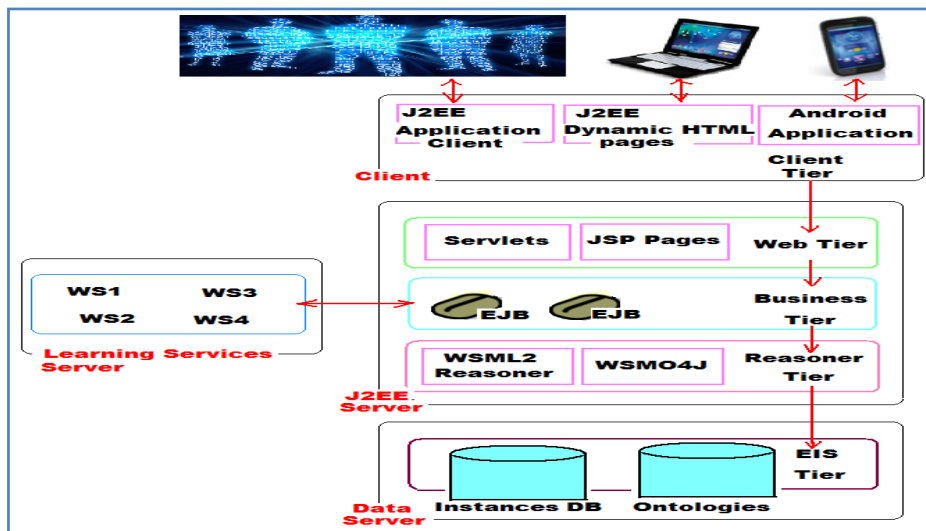


Fig.4 : Technical architecture

B. Main Implemented Components

As illustrated by Figure 4, the business tier communicates with the reasoner tier (semantic tier) to query ontologies or to update them. For instance, the listing 1 illustrates the java code implemented by an EJB to initialize the reasoner which is used to execute WSML queries. The reasoner used is IRIS (line 124) with the WSML flight variant (line128). The query is created as a logical expression (line 120). It is assigned to a String variable as illustrated by the listing 2 (line 100 to 102). It is executed thereafter by the reasoner (line 130). The result is a java collection (a Set) of Maps (key, value) where Terms are bound to variables (shown in Fig.6.).

```
119
120     LogicalExpression query = leFactory.createLogicalExpression(
121         queryString, exampleOntology);
122     Map<String, Object> params = new HashMap<String, Object>();
123     params.put(WSMLReasonerFactory.PARAM_BUILT_IN_REASONER,
124         WSMLReasonerFactory.BuiltInReasoner.IRIS_STRATIFIED);
125     params.put(WSMLReasonerFactory.PARAM_ALLOW_IMPORTS,
126         new Integer(evalmethod));
127     LPReasoner reasoner = DefaultWSMLReasonerFactory.getFactory()
128         .createFlightReasoner(params);
129     reasoner.registerOntology(exampleOntology);
130     Set<Map<Variable, Term>> result = reasoner.executeQuery(query);
```

Listing 1: Reasoner initialization and query execution

```
99
100     String queryString = "?x [hasProfile hasValue ?y, hasSurname hasValue '+' + surname + '+' +
101         " ] and ?y [hasSex hasValue ?s , hasReligion hasValue ?r"+
102         " ] and ?x memberOf CWActor and ?y memberOf CWProfile";
103
104
```

Listing 2: The WSML request as a String

The EJB business methods are invoked by the servlet which returns a JavaBean Result as illustrated by listing 3 (line 48) granting thus the communication between the business tier and the Web tier. The servlet dispatches thereafter, the java bean to a JSP page for presentation purposes (line 52 to 58).

Listing 3: The servlet code invoking the EJB reasoning methods

```
37     protected void processRequest(HttpServletRequest request, HttpServletResponse response)
38         throws ServletException, IOException {
39         response.setContentType("text/html;charset=UTF-8");
40         String login=request.getParameter("login");
41         String password=request.getParameter("password");
42         PrintWriter out = response.getWriter();
43         IrisReasonerExample ex = new IrisReasonerExample();
44
45         Set<Map<Variable, Term>> result=null;
46         Ontology exampleOntology = ex.loadOntology("exemple/http_handicrafts#OntoMeans.wsml");
47         try {
48             result=ex.doTestRun("exemple/http_handicrafts#OntoMeans.wsml",login,"");
49             // System.exit(0);
50         } catch (Throwable e) {
51         }
52         BeanResult r = new BeanResult();
53         r.setEnsemble(result);
54         r.setOnto(exampleOntology);
55         HttpSession session = request.getSession();
56         session.setAttribute("idr", r);
57         RequestDispatcher dispatcher = request.getRequestDispatcher("results.jsp");
58         dispatcher.forward(request, response);
59
```

Listing 4 illustrates the EJB business methods that make use of the WSMO4J API for updating the values of instances attributes. As input parameters the update method receives four strings corresponding respectively to the ontology URL, the instance and attribute IRIs (Internet Resource Identifiers) and the new attribute value. The WSMO4JManager (line 92, line 96) allows creating WSMML attribute values and IRIs by making use of respectively DataFactories (line 110) and the createIRI method (line 97).

Listing 4: Business method for updating ontologies

```

86 public Ontology upDateAttrValue(String Ontoname, String StrI, String Stra, String Strdv)
87     Ontology exampleOntology = loadOntology(Ontoname);
88     if (exampleOntology == null)
89         return(null);
90     else
91     {
92         WSMO4JManager wsmoManager = new WSMO4JManager();
93         Map<String, Object> m=null;
94         Serializer wsmmlSerializer=Factory.createSerializer(m);
95         Identifier I,AtI;
96         WsmoFactory cf=new WSMO4JManager().getWSMOFactory();
97         I=cf.createIRI(StrI);
98         AtI=cf.createIRI(Stra);
99         Set<Concept> sc=exampleOntology.listConcepts();
100        Boolean B=false;
101        while (B==false)
102        {
103            for(Concept c1: sc)
104            {
105                Set<Instance> si=c1.listInstances();
106                for (Instance i: si)
107                    if (i.getIdentifier().equals(I))
108                    {
109                        B=true;
110                        DataFactory df= new WSMO4JManager().getDataFactory();
111                        DataValue d = df.createWsmmlString(Strdv);
112                        i.addAttributeValue(AtI, (DataValue) d);
113                    }
114            }
115            String file="exemple/http_handicrafts#OntoMeans.wsmml";
116            File f=new File(file);
117
118            Writer writer;
119            try {
120                writer= new FileWriter(file);
121                wsmmlSerializer.serialize(identifiable, writer);

```

C. Ontologies Implementation

To implement all defined ontologies, we have used the WSMML language which is implemented by the WSMO studio plug-in. Many reasons have motivated this choice. Firstly, WSMML is in its own a unified language for modelling, querying and making inferences among ontologies. Therefore, there is no extra need for another language for exploiting ontologies. Secondly, WSMML based frameworks are intended primarily for modelling semantic Web services based solutions. They allow for instance to semantically describe Web services. This semantic description will allow thereafter dynamic services discovery, composition and invocation which gives the relevant answer for our system's requirement [8][7]. The following graph (Fig.5) represents an excerpt of implemented ontologies where nodes are either concepts (yellow nodes) or instances (red nodes). Relationships represent either subsumption (subConceptOf) relations or instances (memberOf) relations. So, within the graph a subsumption is represented by yellow directed arrow while instance relation is represented by a red oriented arrow.

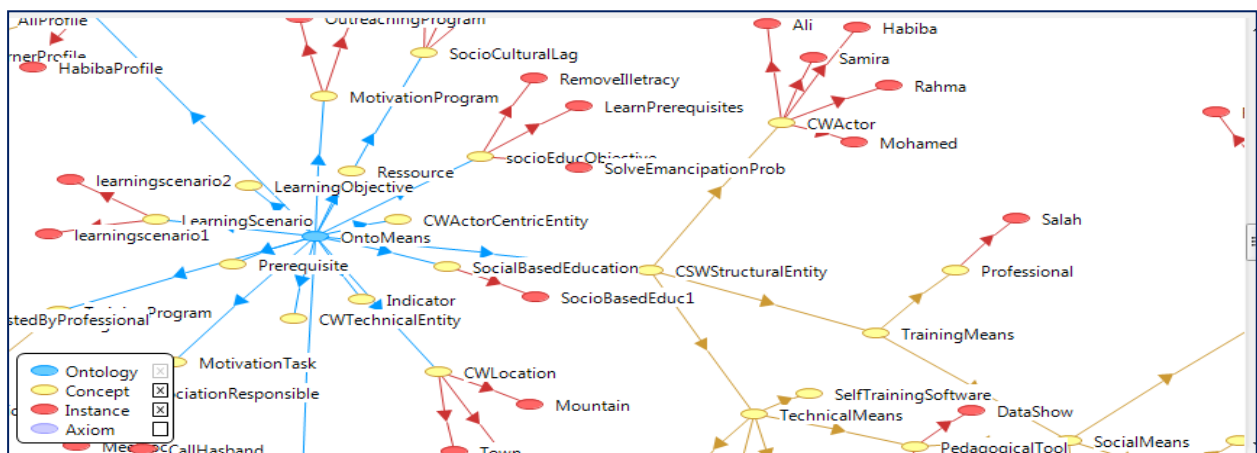


Fig.5. Ontologies graph

Some visible concepts are CWStructuralEntity, CWActor, CWLocation which are part of the Context Ontology. Instances of the CWActor concept are “Ali”, “Habiba”, “Samira”, “Rahma” and “Mohamed”. Each instance may have a set of profiles (CWProfile) which could be SocialProfile, LearnerProfile, etc. The WSML request (Fig.6.) shows all actors with their corresponding profiles and profile attributes values. For instance, the term “Habiba” which is bound to “x” variable representing a member of the CWActor concept. “Habiba” has therefore a “userProfile” represented by the “u” variable, she has a “learnerProfile” represented by the “l” variable.

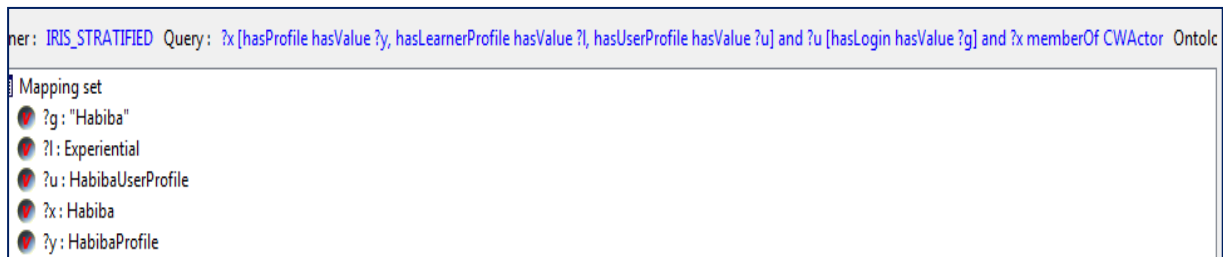


Fig.6. The WSML request for recognizing users’ profiles

Listing 5 illustrates a logical expression (axiom) used for inferring proposed learning activities (advice) to resolve a given social lag. So relevant activities (line 14) are implied by expressions (lines 16 and 17) for social lag “LackOfEmancipation” and so are inferred by applying this axiom.

Listing 5: Axiom relating advices to social lags

```

12 axiom ActivitiesforSocialLags
13     definedBy
14         ?x memberOf activitySocLag
15     impliedBy
16     ?x[hasLearningObjectives hasValue ?y, hasSocialLags LackOfEmancipation]
17     and ?x memberOf Activity.
18

```

D. The usage Of Ontologies with scenarii

Let’s now illustrate with examples how all ontologies were exploited to provide intended solutions. In this paper we focus specifically to show solutions for socio-cultural lags and eventually corresponding Unit of Learning (UoLs) proposed by the system. For that aim, WSML requests tend to find all UoLs where learning objectives best fit the actor’s social lags. Fig.7, illustrates such kind of request. The handicraft woman who has some “lack of emancipation” should carry out a learning activity called “Communicate With Client” to “learn communication bases”.

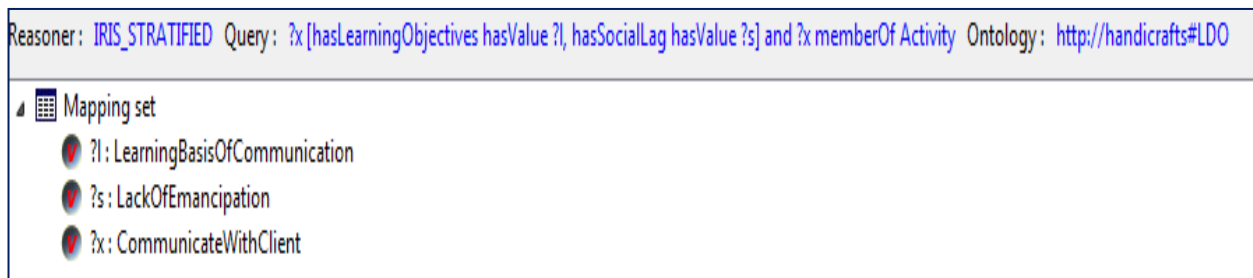


Fig.7. Finding relevant UoL to solve a given social lag

The following interface constitutes the entry point for all actors. After user’s logging, the system recognizes (infers) the user’s profile and provides her/him with corresponding services.

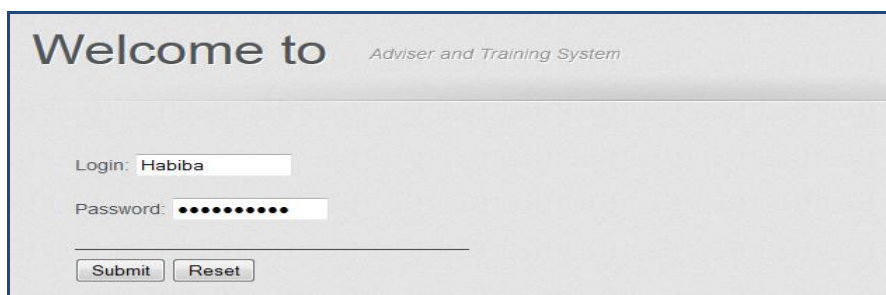


Fig.8. The logging interface

Here are two scenarios illustrating the system’s usage. The first scenario considers a handicraft woman to whom it provides some advices and a learning scenario (training program level 1) after analyzing her profile (Fig.9.).



Fig.9. Profile identification and system’s proposal

The second scenario is intended for the sociologist who observes the handicraft woman “Habiba” and notices her accomplishments. Therefore, she/he uses the interface (Fig.10) to update “Habiba’s” information.

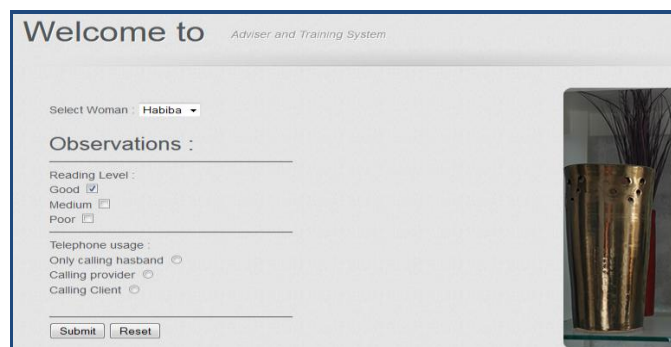


Fig.10. The sociologist interface for updating Habiba’s information.

The updated information allows the system to infer new learning scenarios (UoL) and new advices for resolving remaining social lags as the handicraft woman may be reclassified by the system within another category of social patterns. So, the next time the handicraft woman “Habiba” logs in she will receive other advanced advices and or training programs as illustrated by Fig.11.

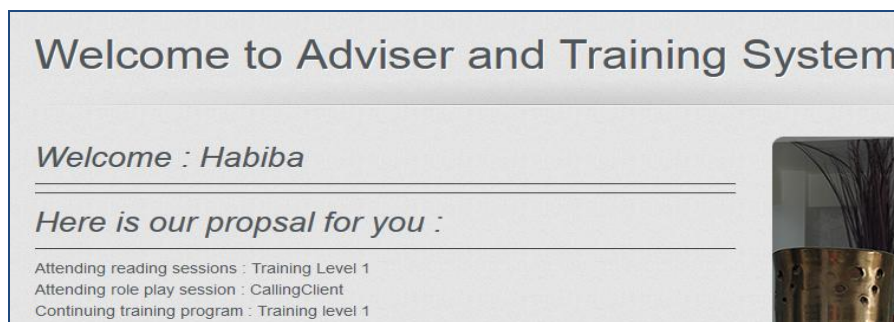


Fig.11. Inferred results after information update.

As a conclusion of this implementation section, we can stress that flexibility of our proposed system will allow us to extend it more and more to give additional answer to new requirements. For instance, the system could provide adaptable user interfaces accordingly to user’s context. Auto-adaptability is another issue as it could be provided thanks to assessment or evaluation services which could be either developed or used as third party services as illustrated by Fig.4.

VI. FUTURE WORKS

We studied the behavior of 120 handicraft women but we would like to extend the number of studied women, from 120 to 500. We aim to improve the analysis step (Step 5 and 6 figure 3) and to propose a more suitable solution with Web Data Mining. Web Mining rapidly collects and integrates information from multiple Web sites. We suggest a web-based, customized hybrid recommendation mechanism using Case-Based Reasoning (CBR) and Web data mining. CBR mechanisms are normally used in problems for which it is difficult to define rules. In web databases, features called attributes are often selected first for mining the association knowledge between related products. Therefore, data mining is used as an efficient mechanism for predicting the relationship between handicraft women’s behaviour, context, profile,

skills, training and training strategy. If there are some training solutions, however, which are not retrieved by data mining, we can't recommend additional information or retrieve distant training services. In this case, we can use CBR as a supplementary AI (Artificial Intelligence) tool to recommend solutions to the similar case. The results showed that the CBR and web data mining-based hybrid recommendation mechanism could reflect association knowledge, socio cultural context and training strategy. Previous research works [6] aim to improve current business process with learning processes and indicators. This approach proposes a framework based on ontologies to support Business Process Improvement, context, and E-Learning. We would like to include these results to improve decision making.

Concerning technical contribution, authors in [14] describe an implementation of an Adapter that converts XML to a Web Service Modeling Language (WSML) [8]. WSML is the language used to describe Web Service Modeling Ontology (WSMO) concepts, related to Semantic Web services (SWS) [7]. SWS are web services that are semantically annotated. The semantic annotation is necessary to address various business logics in an appropriate manner, thus allowing complex business applications to be built and executed. The Web Service Execution Environment (WSMX) is an execution environment for dynamic discovery, selection, mediation and invocation of semantic web services. WSMX is a reference implementation for WSMO. We would like to adopt this approach for future implementation.

VII. CONCLUSION

This research work is based on a statement: TIC cannot be not used by any individuals, especially in Tunisia and Algeria. A classification of the studied population allowed us to notice socio-cultural gaps between women. Based on Ogburn's research work, we propose a genuine approach based on training and simple means deployment to face to socio-cultural lags. In fine, supported step by step by socio educative team, we aim to define a framework based on ontologies and patterns to propose an auto-adaptable system according to context, profile and skills.

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