



COMMUNICATION MODEL OF A LIFE-LONG STUDENT ID CARD

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Introduction

Lifelong learning is not a new concept, but nowadays it has a special value. Development of today's society is reflected in an important role of new digital technologies. Digital technologies are continuously developing and changing our relationship towards life, education, communication, economy and the society as a whole. Digital technologies move former boundaries (state and natural borders), they adapt to the cultural diversity and different lifestyles, different ways of spending the free time, different ways of accessing the information and so on. Maybe the most important influence that the digital time has is reflected on the way in which we communicate and learn. Communication is developed parallel to the development of the digital society, influencing each other. Learning is no longer classical and slow, it has become dynamic, continuous and lifelong. Learning is a continuous process in which the personal results and the motivation for learning during a certain life period are conditioned by knowledge, learning habits and learning experiences, acquired early in life. It is of utmost importance that the learning becomes continuous and systematic in all life stages (from early age until the old age) and in all forms (formal, non-formal and informal). The goals of economic nature are most commonly related to the lifelong learning concept, such as increased competitiveness and permanent employment. On the other hand, we should not neglect equally important goals which contribute to the more active role of an individual in the society. These goals are promotion of social inclusion, development of active citizenship and development of individual potentials of a person. [Dumančić M.; Gregurić M.; i Šimović V., 2008]

Within last 40 years, lifelong learning has been developed from an initial idea into a dominant principle and development's orientation of numerous national educational systems. Its importance is emphasized in an array of international action plans, declarations, documents and conferences (for example, UNESCO's conference Declaration: Call for action Sofia, European Commission Memorandum on Lifelong Learning, and other European Commission documents: Creation of unique European lifelong learning space¹; It's never too late for learning²; Action plan for adult education³; It is always a good time for learning⁴, etc.). Croatia is not behind this trend, so the inclusion of the lifelong learning to the strategic educational documents has become a basic principle of development of Croatian educational system (for example: White book on Croatian education⁵, Development of the system of teaching and education plan 2005-2010, Government of Republic of Croatia⁶, Strategy of adult education⁷, Declaration of knowledge of Croatian Academy of Science and Art (HAZU)⁸).

In the last ten years, researches on possibilities to personalize educational process for each individual student have become more and more active. Adaptation of education is possible with the assistance of ICT technology which supports modular curriculum which in turn uses learning objects and adapts education to the student according to the student's individual educational styles.⁹ Distance learning systems have been developed intensively during the last ten years and are imposed as one of the most important areas of implementation of ICT technology in organization and implementation of various forms of education: from academic to different forms of lifelong education¹⁰. The area which directed its research towards the adaptation of learning environment and educational materials to an individual user, their psycho-physical characteristics, learning styles, former knowledge, communication motivation etc., is adaptive hypermedia system.

Adaptive hypermedia system

Development of adaptive hypermedia system (AHS)¹¹ has started in the early 1990s. Hypermedia model is extended user model. At the beginning, AHS was inspired by ITS system (intelligent tutoring systems) and was trying to combine adaptive instruction systems and hypermedia based systems [Brusilovsky P., 1996]. Sam Brusilovsky defined AHS systems as follows:

Adaptive hypermedia system entails the complete hypertext and hypermedia systems which retrieve some of the user's aspects from the user's model, and accept this model for adjustment of different visible user system aspects.

There are three determining criteria for a satisfactory AHS system: system based on hypertext or hypermedia, user's model, and the system which adapts hypermedia based on user's model. It is easy to foresee the possibilities of AHS systems in education, electronic business, information systems as well as assistance systems, based on these elements.

According to Henze and Nejd, AEHS is composed of parts of the document, user's model, observation and adaptive components [Henze N.; Nejd W., 2003] Document parts belong to the hypermedia system and are enriched with additional information (notes, domain graphic charts etc.). User models are stored through descriptions of and conclusions on the user, their knowledge and characteristics. Information on interaction of the user and AEHS system stem out from the observation of the user. Information gathered during observation upgrade the user model as well.

Adaptation process is composed of three levels: gathering the feedback information on the user, processing the information and upgrading the user model, use of the model in adaptation process again. [Brusilovsky P.; Tasso C., 2005]; [Garrison D.R.; Anderson T., 2003] Before the adaptation process it is necessary to conduct the process of gathering information on the user. Part of the system gathering information on the user is doing so based on the interaction of the user and the system through the elements of user's interface. User's interface enables the gathering of information on the use of mouse, typing skills, audio and video elements. User's model interprets this information. Based on this new information it can interpret invalid user's activities such as adjustments of user's language and document's language, correction of typing errors, correction of font size etc. [Dumančić M., 2010]

Computer system activities are always initiated by the system. User's model can use controls and modify the activities according to the user's characteristics. This method includes compatibility of system's behavior and the user's characteristics, or adjustment of the content through different forms of presentation. For example, distance learning systems are able to adjust activities on the user's knowledge domain with the simple information which enable the student more knowledge, or more different materials for students with more knowledge. Adaptation of the user model is performed within the system, which enables the system support during activities and filtration of the information. [Kay J., 2000]

1 http://europa.eu/legislation_summaries/education_training_youth/lifelong_learning/c11054_en.htm

2 http://ec.europa.eu/education/policies/lll/adultcom_en.html

3 ec.europa.eu/education/policies/adultcom558_en.pdf

4 ec.europa.eu/education/policies/adultcom558_en.pdf

5 www.see-educoop.net/education_in/pdf/bela_knjiga-toc-cro-hrv-t02.pdf

6 http://www.vlada.hr/hr/preuzimanja/publikacije/plan_razvoja_sustava_odgoja_i_obrazovanja_2005_2010

7 www.hzpou.hr/stranice/3/17-100.pdf

8 <http://www.humboldt-club.hr/obrazovanje/hr/dekl-o-znanju-hazu.htm>

9 Implementation of ICT in a lifelong education is most visible in the use of distance learning and teaching system. Distance learning



systems enable the availability of education regardless of place and time which is a very important fact for people who spend the majority of their time in a work place. Due to the lack of time these individuals are unable to participate in the classic forms of education in schools or companies specialized for additional education, and specialization of knowledge and skills.

databaseUsermodel

10 Fast development of this form of learning and teaching resulted in numerous research in this area and inclusion of various information from other areas, such as information systems, multimedia, pedagogy, didactics, methodic, psychology, communicology, knowledge management etc., S – Adaptive Hypermedia Systems

Koch lists seven elements of a student model's goal [Koch N.,2000]:

- Assist the user during problem solving
- Provide the user with adapted information
- Adapt user's interface to the user
- Assist the user in search of information
- Provide the feedback to the user about their knowledge.
- Support to joint work.
- Providing assistance in work with the system.

Listed goals and intentions are directed to the user and adaptation of the interaction with the system in order to master the learning materials, i.e. the curriculum in the most efficient way. Development of IT technology and especially of the artificial intelligence and expert systems provide simpler gathering and storing of information on every student, for teachers. The information is stored within the student's model. Besides the storage of information, systems enable the processing of the information, their classification, evaluation etc. It is necessary to see the difference between the user's profile¹² and user's (student's) model. Student's profile is a sequence of personal information. The information are stored without adding the description or interpretation of the data.

Information gathered are collected and are not definite, which means they can be altered at all times. Based on the content and quantity, information on each user are stored in the student's profile, which can be used to modify the student's model. Instruction model is developed with the assistance of expert systems, ontology and pedagogical agents in order to create the best instruction model for each individual student. Instruction model uses the semantic web, as well as the expert knowledge which is recorded and organized within the databases as declarative and procedural knowledge. [Dumančić M.; Gregurić M.; i Šimović V.,2007]

Developed instructional model is entered into the instruction model's database as a pattern which can be used by the system as a future standard to carry out the learning process, and to successfully manage set goals and objectives.

ID Student Card

Development of student's model starts with the first interaction between the user and the system. Interactions are repeated and continuously build up the student's model. Information gathered from the student's model are stored within the student's profile. Student's profile describes cognitive skills, intellectual capabilities, learning style, attention span, characteristics of and possibilities for interaction between the user and the system. Alongside with this data, student's profile also contains different information on attended programs, acquired competencies and skills, student's communication model, multimodal characteristics etc.

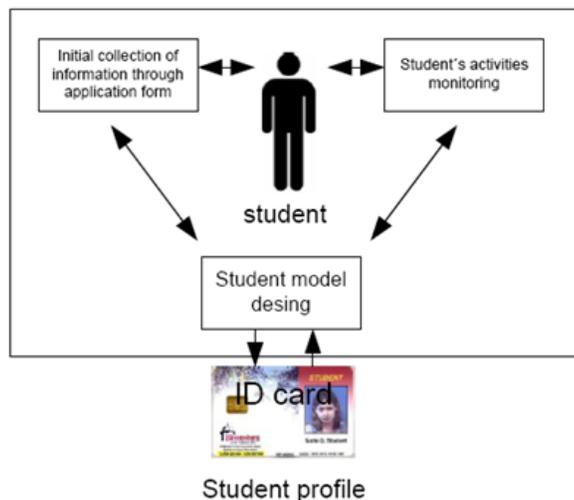


Figure1: Building the user's model

In order to successfully build the student's model, we need to build the sequence of subsystems for storage of student's profile and its continuous updating with the assistance of smart card technology or with the assistance of the system for follow up of former schooling and advancement by the Ministry of Education. Information stored on the student's ID card provide the insight into the characteristics of student's model of each lifelong student, regardless of when he finished his schooling, a specialization program or any other type of education.

11 AHS – Adaptive Hypermedia Systems

12 User Profiling



The system should store the information during the schooling, continuous education, and lifelong education. At the beginning of their education, specialization or any other type of learning, the students would enclose their ID educational card with all the information from their student model. Gathered information will enable for the simpler development of student's model. [Dumančić M.,2011]

Student model will enable the adaptation of the system, i.e. the sequence of adaptive processes towards the user, and will fulfill the expectations of students about distance learning as being simple, efficient and fun way to learning and to teach. The teacher can adapt learning materials, classroom assignments as well as the whole learning process to the student, by using the student model and the system.

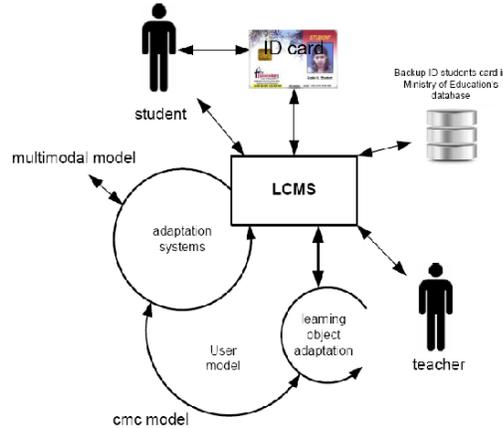


Figure2: ID student card model

CMC adaptation model

Computer-mediated communication (CMC) is often mentioned in the reference literature as a process with the assistance of which people create, exchange and perceive the information using the telecommunication systems. Romiszowski and Mason continue to expand on the first definition of CMC by mentioning „studies of CMC can view this process from a variety of interdisciplinary theoretical perspectives by focusing on some combination of people, technology processes, or effects“. [Romiszowski A.;Mason R.,1996] Wood and Smith consider CMC as an integration of computer technology within our everyday lives. [Wood A.F.;Smith M.J.,2005] Jones states that CMC has more important social aspects through the use of asynchronous and synchronous communication, than the technology which it supports. [Jonassen D.;Collins M.;Campbell J.; i Haag B.B.,1995] CMC is not only a technology; it is a communication supported by technology. Under this form of communication we find all forms of asynchronous communication based on text as a basic media. These are e-mail, discussion forums, bulletin boards, videoconferencing systems and other types of users within the system. Some forms of communication can be exclusively asynchronous, such as chat systems (Google talk, NetMeeting, ICQ, etc.).

One of the most important elements of mastering the curriculum is communication. Mehlenbacher explains the role of communication and communication design on the learning theories. [Mehlenbacher B.,2008] Distance learning systems use all forms of CMC communication as basic communication between students and teachers during the learning process. Communication within distance learning system, regardless of the type of program implemented or population, represents the most important element of the system. CMC technology enables equal participation in communication for everybody. It differs from F2F forms of teaching process in which the communication within the distance learning system is most often one way. CMC communication can be asynchronous with equal possibilities of use. With regard to the possibilities of distance learning and teaching, we can talk about „many-to-many communication, synchronous discussion in the composition classroom, synchronous discussion in the foreign language classroom, time-and place-independent communication, long-distance exchanges (both one-to-one and many-to many) and hypermedia information and student publishing“. [Warschauer M.,1997]Walther emphasizes in his articles that the use of CMC has two effects: first effect supports impersonal and interpersonal interaction between the users, and second effect ...

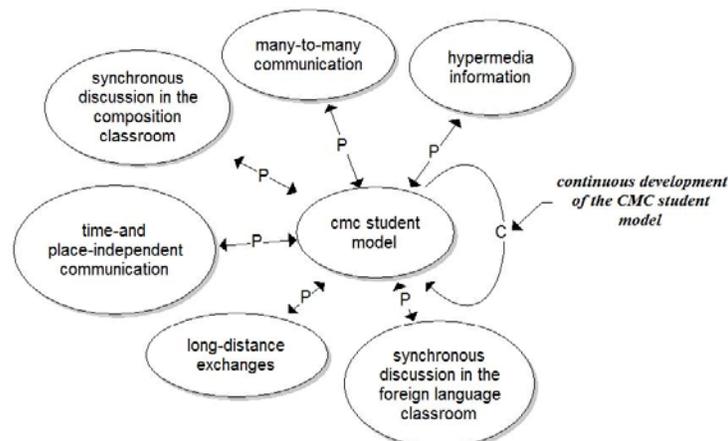


Figure3: CMC the user's model



Students can more or less actively or passively participate in distance learning. This element is perceived through their use and participation in various forms of communication. While certain students are actively using the CMC system, especially during the teaching process, others will just follow the communication, without participating in it. The later are called lurkers or passive observers. They appear also in F2F communication. It is necessary to mention that identity is a complex personal and social construct, consisting in part of who we think ourselves to be, how we wish others to perceive us, and how they actually perceive us. In particular, CMC research has looked at the second of these fragments: how we wish others to perceive us. The process of setting forth an image we want others to perceive is known as self-presentation. In considering how people go about constructing their self-presentations online, we review research that considers several different channels for CMC. Creating the identity represents a sort of a student communication model which is built during the use of adaptive distance learning systems.

Under the educational communication CMC model we include gathering of all information on forms and ways of using the CMC, which developed through the communication between students and teacher as a leader of learning process; different forms of interaction with the system through all forms of multimodal interfaces; as well as ways and forms of communication between students through different forms of communal work or social groups which are formed during the educational process. It is possible to create the user CMC model, based on gathered information on forms and ways of communication. Lastly, CMC model can help the adaptation of teaching and learning system to each user, according to the user model and CMC model.

Conclusion

Lifelong student ID card enables for simpler preparation and implementation of lifelong education programs. Adaptable systems are able to create different student models. They can be stored onto the student ID card which can help any system to adapt the system of teaching and learning to the specific properties of each student. Communication CMC model was developed within the student model and monitors all users' communication activities. Information are stored and each time the user calls for the subsystems in order to communicate, the system will adjust all elements in order to provide for the successful communication. CMC model teacher can obtain information on every student who is acquiring the learning materials, their communication skills and habits, and then plan the interpersonal communication with the user based on that data. This is the easier way to prepare the learning materials and form student groups with similar or identical goals, former knowledge, interests and learning styles. Student ID card may be helpful to all the participants of the learning process.

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