Integrating Adults' Characteristics and the Requirements for Their Effective Learning in an e-Learning Environment

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Abstract. Learning technology, through e-learning, allows adults to adapt learning to their own time, place and pace. On the other hand, the adults' specific characteristics as learners and the requirements for their effective learning must be integrated in the design and the development of any learning environment addressed to them. Adults in an online environment have also to deal with new barriers related to access to the courses, the sense of isolation and the sense of immediacy with educator and other learners. This paper is dealing with the way through which an online environment can overcome these barriers and can integrate adults' characteristics and requirements for effective learning. The use of the appropriate communication tools by designers, developers and educators seem to provide the answers as these tools promote immediacy and interaction, both considered very important factors in online educational environments and affect the nature and the quality of communication and learning.

Keywords: Adult education, E-learning, Communication tools, Immediacy, Interaction.

1 Introduction

In modern societies adults' education is a constantly growing field as adults are more oriented towards lifelong learning in order to upgrade their knowledge and skills so that they can meet with the increased demands of personal, social and professional life. Today, learning technology, especially through e-learning, is providing adults with the tools which enable them to adapt learning to their own place, time and pace. On the other hand, adults as learners have considerably different characteristics from children, and these characteristics, as well as the requirements for effective adult learning must be taken into consideration and be integrated in any e-learning environment. This paper is dealing with the adults' characteristics as learners, the requirements for effective adults' education, the barriers adults are facing in an e-learning environment, in relation to immediacy, interaction, active participation and collaboration and investigating the most effective on-line environment for adult education.

2 Adult Education

It was in 1968 when in the United States Malcom Knowles[1] used the term androgogy[2] in an article in Adult Leadership and he has become known as the principle expert of andragogy which is a set of assumptions about how adults learn.

Malcolm Knowles [1] who is considered the father of Andragogy worked in terms of identifying the characteristics of adult learners as opposed to children as learners. His five assumptions are listed below:

1. Self-concept: As a person matures his self concept moves from one of being adependent personality toward one of being a self-directed human being
2. Experience: As a person matures he accumulates a growing reservoir of experience that becomes an increasing resource for learning.
3. Readiness to learn. As a person matures his readiness to learn becomes oriented increasingly to the developmental tasks of his social roles.
4. Orientation to learning. As a person matures his time perspective changes fromone of postponed application of knowledge to immediacy of application, and accordingly his orientation toward learning shifts from one of subject centeredness to one of problem centeredness.
5. Motivation to learn: As a person matures the motivation to learn is internal

2.1 Characteristics of Adults as Learners

Studying the literature on adults' learning brings up the fact that adults as learners have specific characteristics that set them apart from children.

Although the characteristics pointed out by authors and researchers are various, there seems to be a general consensus in the literature on some common characteristics that have an impact on adults' learning efficacy and the overall classroom experience [2], [1], [3], [4], [5], [6], [7], [8], [9], [10], [11].

Table 1. Characteristics of adults as learners

1.	Adults participate in the learning process with concrete intents, goals and expectations
2.	Adults already have certain knowledge and experience as well as established perspectives
3.	Adults have already developed personal styles of learning
4.	Adults prefer self-directed learning and active involvement in the educational endeavor
5.	Adults have to deal with certain barriers on their learning process

1. They participate in the learning process with concrete intents, goals and expectations.

Adult learners are coming in the educational process with concrete and immediate goals (e.g. professional, social, personal development). Learners have specific

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[1] Knowles,M. S. (1968). Androgogy, not pedagogy, Adult Leadership, 16, 350-386.
[2] Andragogy ("andr"-meaning "man") could be contrasted with paedagogy (from greek paedagogos, from "pais"-meaning child+ "agogos" meaning leader).

expectations from the learning process and when this process meets their expectations then their motivation for learning is empowered, their positive attitudes are enhanced and their negative attitudes are transformed to positive ones, contributing to the achievement of the educational goals.

2. They already possess certain knowledge and experience as well as established perspectives.

Adults enter a learning situation having a specific spectrum of prior knowledge and a variety of life experiences – different for each individual. Adults would prefer that these knowledge and experience are both considered and exploited during their current educational process. Learning is facilitated when the instruction is related to these experiences. The rejection of learners' experience is often taken in as a personal rejection which leads to negative reactions and attitudes in the context of the educational process.

3. They have already developed personal styles of learning

Each adult has already developed his own learning 'model'. In order to have an effective learning process, the learning style and personal pace of each learner has to be taken into consideration, leading to the adoption of the appropriate learning methods and techniques.

4. Adults prefer self-directed learning and active involvement in the educational endeavor

Adult desire and strive for self-directedness, emancipation and active participation in every situation in life in which they are involved. This fact affects their attitude towards active participation in the educational level. Usually, adults prefer to be self-directed learners.

5. They have to deal with certain barriers on their learning process

The educational process of adults may face barriers which could render the whole procedure ineffective or cause its termination if not dealt with appropriately. There are three main categories of barriers which adults face as learners [5], [12].

- ☐ Barriers related to the organization of educational programs (goals, coordination, infrastructure etc.)
- ☐ Barriers arising from the situation in which the learners are i.e. physical or contextual factors, concerns or troubles related to personal problems, bad relation between teacher and learners, or between learners, lack of communication inside the learning group.
- ☐ Internal barriers which the adults may possess towards themselves.

By studying the above characteristics we realize that in the context of adult education the learning process is influenced by many interrelated factors with unpredictable results. All the characteristics of adults could have controversial effects in the learning process, operating either as catalysts for effective learning or as hindering factors [5], [13], while variety is the main characteristic of adult learners and adult learning processes [6].

2.2 Requirements for Effective Adult Learning

The main requirements for effective adult learning, as these are defined by taking into consideration the above mentioned characteristics and in the relative literature [14], [15], [16], [17], [6], [8], [11], are depicted in the following table.

Table 2. Requirements for effective adult learning

a. education is centered on the learners	The education meets the needs, the interests and the expectations of learners
	The ways of learning which the learners prefer are seriously taken into consideration when instruction is organized
	The knowledge and the experiences of the adult learners should be used as much as possible in the educational process
	The barriers which the learners usually deal with are defined and ways to overcome these are sought after
b. the active participation of the learners is both encouraged and intended	The learners are participating actively in the transformation of the learning process (curriculum, choice of educational material and methods as well as the arrangement of many practical issues which rise during the education e.g. time schedule of the meetings, use of audiovisual media etc)
	In the learning process active educational practices are used. Through these practices the development of a critical way of thinking is promoted as well as the "learning to learn" strategy in order for the learners to be able to continue their learning progress after the end of educational process.
c. the creation of a learning environment based on communication, cooperation and mutual respect	Bidirectional relations between educators and learners are cultivated, governed by sincerity, respect and acceptance.
	Relations of collaboration, mutual respect and trust are cultivated between learners, functioning as a group.

3   The e-Learning Environment for Adults

Taking into consideration the factors which affect adults' learning, as they have been analyzed in the previous section of this paper, the online learning environment within which an adult learner could learn effectively has to meet one's needs, expectations and interests, to take advantage of one's existing knowledge and learning styles as well as to promote the multiple intelligences, active learning and participation, to respect each learner's own pace in time, space and momentum and to help overcome the barriers which an adult has to face during the educational procedure (personal, social, vocational).

Besides the adult related barriers adult learners are already facing, in an online environment they have to deal with new barriers related to access to the courses, the sense of isolation and the sense of immediacy with educator and other learners [18], [12]. An effective educational environment has to overcome all these barriers. In the next sections we shall analyze the notion of immediacy and interaction as both are considered very important in online educational environments and affect the nature and the quality of communication and learning. In the same direction we shall elaborate on the preferable communication mode and the importance of communication tools in an online environment.

3.1   Immediacy and Interaction in Online Educational Environments

The two very important intertwined issues are those of interaction and immediacy and their role in online education. Immediacy and Interaction are considered vitally important for online educational environments and affect the nature and the quality of communication [19], [20].

3.1.1   Immediacy in On-Line Learning Environment

Mehrabian [21] defined immediacy as the extent to which selected communicative behaviors enhance physical or psychological closeness in interpersonal communication or in other words lessen the psychological distance between communicators. Immediacy can have verbal and non-verbal forms. Non-verbal immediacy would therefore be understood as a sense of psychological closeness produced by physical communicative behaviors such as facial expression, eye contact, posture, proximity, and touch. Verbal immediacy would thus be a sense of psychological closeness produced by word selection. For example, the use of the word "we" fosters increased relational closeness and is considered more immediate than the comparable statement "you and I" [22].

Merlose and Bergeron [20] mention that immediacy behaviors are believed to enhance instructional effectiveness in online classrooms, although the non verbal cues are absent and the construct is not easy to articulate. The experience of liking and feeling close to instructors can lead to positive effects in online classrooms and there are correlations between immediacy and affective learning [22], [23].

LaRose and Whitten [24] created a model concerning the interaction and instructional immediacy for Web-based courses. Their model incorporated not only teacher and student immediacy, but also computer immediacy, which they proposed as a result of an ethnographic content analysis of three Web courses. Within this

social cognitive framework, they concluded: "There are three possible sources of immediacy in the virtual classrooms of the Web that may create feelings of closeness: 1) the interactions between teacher and students (teacher immediacy); 2) interactions between students (student immediacy); and 3) interactions with the computer system that delivers the course (computer immediacy). Collectively, these sources constitute instructional immediacy. In each case, learning is motivated either through social incentives (e.g., approval for good behavior, expressions of interest in the student) or status incentives that recognize or enhance the status of the learner. The immediacy mechanism is enactive if it results from the interaction between a specific individual learner and one of the other agencies present in the classroom. Immediacy is vicarious if it operates through the observation of other learners as they interact "(p. 336).

Butland and Beebe [25] find evidence that instructor immediacy in a synchronous e-learning environment, such as immediate verbal and nonverbal communications, including timely feedback and use of emoting in text (such as using a word or phrase enclosed in angle-brackets to express emotion, e.g., <sigh>, <grin>), promote increased learning. Grooms [19] in her study concerning communication immediacy in an online doctoral level course points out the importance of the nature and medium of response as well as the frequency of response as variables of interaction. Thus, online educators need to manifest immediate behaviors when providing feedback to distant learners. Immediacy concerning time is very crucial in order to overcome time and space as barriers and promote interaction in online learning.

3.1.2 Interaction in Online Learning Environment

Interaction is at the heart of the online learning experience. Moore's transactional distance theory considers interaction [26] a defining characteristic of education and regards it as vitally important in the design of distance education.

Researchers have shown [27], [28], [29]) that interaction is a significant component in promoting learners' positive attitudes towards distance education and when learners perceive a high level of interaction, they will be more satisfied, but when they perceive low interaction, they are dissatisfied and their academic achievement is harmed.

Moore [26] identified three kinds of interactions that support learning: learner-content, learner-instructor, and learner-learner interactions. Learner-content interaction is the process in which students examine, consider, and process the course information presented during the educational experience (learners' interaction with the knowledge, skills and attitudes being studied). According to Moore and Kearsley [30], "Every learner has to construct knowledge through a process of personally accommodating information into previously existing cognitive structures. It is interacting with content that results in these changes in the learner's understanding" (p. 128). Learner-instructor interaction is communication between the instructor – educator and the learner in a course. In the case of online learning, such interaction usually occurs via computer-mediated communication and is not strictly limited to instructional communication that occurs during the educational experience, but may include advising, offline communication, and personal dialogue. Interaction with instructors includes the myriad ways instructors motivate, enhance and maintain the learners' interest, present information, demonstration of skill, or modeling of certain attitudes and values, organize students' application of what is being learned, evaluate, counsel, support and encourage learners.

According to Rovai [31] in Asynchronous Learning Networks (ALN) learner-instructor interaction takes the form of intellectual discussion or stimulating exchanges of ideas. He stresses that facilitating productive interactions is probably the most important responsibility of the online educator.

Finally, learner-learner interaction is communication between two or more learners, alone or in group settings, with or without the real-time presence of an instructor. Such interaction often occurs via asynchronous computer-mediated communication, although it may include other forms of interpersonal and small group communication, online and offline, that occurs during the duration of a course. Learner-learner interaction among members of a class or other group is sometimes extremely valuable resource for learning, and is sometimes even essential.

Moore at the end of the 80's supported that it was needed to organize programs to ensure maximum effectiveness of each type of interaction, and ensure they provide the type of interaction that is most suitable for the various teaching tasks of different subject areas and for learners at different stages of development. In our days with the possibilities which the learning technology offers we can plan for all three kinds of interaction selecting the appropriate media and tools from a rich array.

This threefold interaction construct has been extended and adapted by subsequent researchers in the area of distance and Web-based learning. Other types of interaction has been added to the initial model as "learner-interface interaction" which occurs when learners use technologies to communicate with the content, ideas, and information about course content with the educator and their classmates [32]. According to Hillman et al. [32] learners need to be fully literate with the interfaces which are used in communications technologies in an e-learning course or a program. "The learner must be skilled in using the delivery system in order to interact fully with the content, instructor and other learners" (p.40). Furthermore, Brunham and Walden [33] have defined learner-environment interaction which is "a reciprocal action or mutual influence between a learner and the learner's surroundings that either assists or hinders learning".

Anderson and Garrison [34] added three more types of interaction: teacher-teacher, teacher-content and content-content.

Anderson [34] has developed an equivalency theorem concerning interaction and its educational effectiveness as follows:

> *Deep and meaningful formal learning is supported as long as one of the three forms of interaction (student–teacher; student-student; student-content) is at a high level. The other two may be offered at minimal levels, or even eliminated, without degrading the educational experience.*
>
> *High levels of more than one of these three modes will likely provide a more satisfying educational experience, though these experiences may not be as cost or time effective as less interactive learning sequences.*

This theorem implies that an instructional designer can substitute one type of interaction for one of the others (at the same level) with little loss in educational effectiveness – thus the label of an equivalency theory. (p. 4).

As Anderson [34] very accurately states, "Efforts at enhancing teacher-student interaction through an increase in teacher immediacy (McCrosky and Richmond, 1992), or through use of theatrical or multimedia presentation techniques, can also be expected to increase the quality of student-teacher interaction. Further efforts at enhancing student-student interaction in the classroom through case or problem based learning activities, have long been shown to increase not only student achievement, but also student completion and enjoyment rates (Slavin, 1995). In these types of activities, increased student-student interaction is substituting for student-teacher interaction"(p.6).

3.2 Online Communication Modes

A closer examination of the barriers adults may face in an e-learning environment reveals that some of them are related with e-learning itself, i.e. computer literacy, while others are related with the selected mode of online communication (the two basic modes being synchronous or asynchronous) and the way each mode affects isolation, interaction, immediacy etc. The mode of online communication is also affecting some other important adults' requirements for effective learning such as time management, active participation and the development of the appropriate learning environment.

Both communication modes have their strong and weak points. As in many other areas there is no magic recipe. We have considered the asynchronous learning environment to be better suited to the characteristics and requirements for effective adults' learning, as analyzed in the next section.

3.2.1 Asynchronous Learning Environment in On-Line Learning Environment

The asynchronous online learning environment seems to be preferable over the synchronous online learning environment for adults' education, as it allows learners to follow their own pace, overcoming the constrains of time and to harmonize their personal, vocational and social life with education [35],[36]. Furthermore, asynchronous online education appears as one of the most appealing instructional methods for adults' education as it combines flexible access to teaching material with time to reflect and self-study techniques with collaborative learning, while involving the use of low-cost technology.

The greatest benefit of asynchronous learning environment is its flexibility, as it gives the freedom to learners to access the course and participate at any time and from any location they choose through an Internet connection [37], [38], [39], [40], [41].

The advocates of asynchronous learning support that this kind of a learning environment provides a "high degree of interactivity" between participants who are separated both geographically and temporally [35]. Since learners have an equal opportunity to participate in an asynchronous communication from where and when it suits them, they can express their thoughts without interruption, they have more time to reflect on and respond to class materials and their classmates than in a traditional classroom [42]. In communication which takes place in synchronous mode the learners who have a language barrier or those lacking enough confidence they do not dare to speak up. Even such learners are seen vehemently participating in electronic discussions through asynchronous mode [43].

Many studies have also highlighted that on-going asynchronous interaction -such as forums-are preferable to synchronous computer-mediated communication groups in that they help participants to build a better context in which learning can take place [44].

Besides the argumentation against distance learning as stated by Kochery [45], who found that students learning over a distance often feel alone and separated from not only the teacher, but also from the socialization with other students, the adversaries to asynchronous learning environment support that students experience isolation and social disconnectedness which, correlated with students' difficulties with the course, result in failing grades, noncompletion, or withdrawal [18].

The answer to the above criticism comes from recent technological innovations, which have reduced significantly the barriers in communication and interaction and have allowed new forms of personal and group interaction as well as course delivery [46], [47].

It is broadly accepted that learning technology has changed the teaching and learning process. Multimedia, communication tools and Internet navigations are becoming more widely used in different educational levels, influencing education, motivating students, promoting learning, and changing classroom interaction.

Another advantage of the asynchronous environment is that all materials and all interactions that occur within this environment, such as e-mails, discussions etc are archived, so that learners and educators can go back and review course materials, assignments, presentations as well as correspondence and discussions between participants [48].

In order to benefit from an asynchronous online learning environment, learners have to overcome the barriers inherent to any online learning environment which are related to the learners' access to computers and the Internet. Although personal computers and web access are becoming more and more pervasive every day, this requirement can be a barrier to entry for many learners.

Once the access barrier is overcome, the acquisition of skills needed to participate in the electronic environment by learners and educators in the beginning of each educational program are considered essential as they influence directly all forms of interaction which are taking place in an e-learning environment [32]. The institutions must also provide a computer network infrastructure and the technical support needed to develop and maintain asynchronous learning environments.

3.3   The Role of Communication Tools in an Asynchronous Online Learning Environment in Reducing Isolation and Promoting Immediacy, Active Participation, Interaction and Collaboration Communication Modes

In order to promote immediacy, active participation, interaction and collaboration, as well as fight isolation in an asynchronous online learning environment, communication tools such as email, forums, threaded discussions, conferencing systems, online discussion boards, wikis and blogs, video-conferences etc. become of paramount importance. Course management systems such as Blackboard, WebCT, Moodle, Dokeos and Sakai, have been developed to support online interaction and collaborative learning, providing tools that allow users to organize discussions, post messages and replies, upload or download and access multimedia and working in smaller or larger groups.

Some of the above communication tools are specifically connected to certain barriers or requirements for effective adult learning, therefore their importance is further elaborated.

3.3.1   The Importance of Forum/Electronic Discussions Groups in an Asynchronous Online Environment

As Freire [49] supports learning is itself a reflective process and it is dialogue that is central to this reflection.

Discussions are especially important when we are working with the middle and higher level of the cognitive domain (application, analysis, synthesis and evaluation) as well as with all levels of the affective domain [10].

Brookfield [50] also says that discussion supports both cognitive and affective ends, such as problem solving, concept exploration, and attitude change, as well as the kind of active participatory learning that results in engaged learning within the classroom.

By using asynchronous communications tools, learners actively construct their own learning by engaging themselves and others in reflective explorations of ideas, drawing conclusions based on their explorations and synthesizing those conclusions with previous knowledge.

Therefore, forums/electronic discussions groups seem to have taken the lead among asynchronous communication tools [44], promoting collaborative learning and reflection and improving the quality and quantity of education in online learning environments [48], [51], [52].

Discussions help learners explore different perspectives, recognize their own values and assumptions, develop their ability to defend ideas and learn to respect others' opinions and viewpoints. Discussion topics should be interesting, meaningful and relevant to everyone in the group.

In forums and electronic discussion groups, people work together to form ideas, argue points, and solve problems. All learners have a voice and no one can dominate the conversation. The asynchronous nature of the discussion also makes it impossible for even an instructor to control. Accordingly, many educators note that students perceive online discussion as more equitable and more democratic than traditional classroom discussions [53].Whereas in face-to-face meetings learners must make their statements one after the other synchronously within a limited timeframe, in forums they can take their time and write their messages asynchronously when it suits them, or within a larger timeframe. Since learners can express their thoughts without interruption and in time convenient for them, they have the opportunity to reflect on their classmates' contributions while creating their own, and on their own writing before posting them [42], [54]. It is possible for learners to "rewind" a conversation and thus they have time to carefully consider their own and other learners' responses leading to deeper discussion ([48]. This tends to create a certain mindfulness among learners, encourages deeper level of thinking, discourse and a culture of reflection in an online course [55], [53],[56]). Many researchers suggest that asynchronous threaded discussion boards are a viable instructional method for sustained written interaction that promotes critical thinking [18].

Despite the fact that forums/electronic discussion groups are text-based and so lacking in visual and verbal cues, most participants find them strangely personal [57] and J. Walter has called them "hyperpersonal" [53].

MacNamara and Brown [48] support that discussion forums need to be carefully structured and managed to ensure that they result in the deep level of collaborative reflection that is desired. They propose three factors which should be considered in planning an online discussion: the organization of the forum, the motivation of students to participate and the ability of students to participate effectively.

At this point the role of the educator must be stressed. According to the literature the most appropriate role for the educator using threaded discussions is that of facilitator [18]. The educator's tasks with regard to the facilitation of discussion boards are: a) setting the scene, b) monitoring participation, c) facilitating critical thinking and d) promoting student collaboration [58].

Educators may lead or facilitate discussion by asking for clarification, summarizing major points, and focusing on the issue, or they may participate as a member of the group while learners take on the roles of keeping things on track and summarizing [10].

Summing up, it is evident that the use of forums/electronic discussion groups in the e-education of adults could play an important role promoting reflection, critical thinking, collaborative learning and interaction between learners and educator as well as interaction between learners. The asynchronous mode seems to provide a more equitable and democratic environment and better time management for learners enhancing the role of the educator as facilitator.

4 Conclusions

Adults as learners have specific characteristics which must be observed in the design and development of an e-learning environment. Adults in an online environment have to deal also with new barriers related to access to the courses, the sense of isolation and the sense of immediacy with educator and other learners. An effective educational environment has to overcome all these barriers. Designers, developers and educators using effectively the appropriate communication tools have to promote immediacy and interaction as they are both considered very important in online educational environments and affect the nature and the quality of communication and learning.

More precisely in order to enhance adults' learning the following points must be observed in the design and development of e-learning processes:

☐ Asynchronous learning mode seems to suit better to adults' characteristics and requirements for effective learning.
☐ Learners must actively participate as much as possible through all the phases of the educational process (needs analysis, design, development, implementation, evaluation)
☐ The content of the education must be formed and adapted according to the needs analysis results. That means that the content will meet the expectations, needs and interests of the learners.
☐ The appropriate communication tools which learning technology offers in our days must be integrated in the e-learning environment, in order to

promote immediacy and interaction between educator and learner, between the learners, between learner and content and between learner and interface. Forums and electronic discussions groups have a central role in the educational process.

☐ Activities that promote and support
- o higher-order thinking (analysis, synthesis, evaluation),
- o critical thinking
- o collaborative work
- o self-directed learning and learners' explorations

must be designed.

☐ Design for supporting personalized learning must be implemented. The content and the presentation of the educational material must correspond to the different needs and learning profiles of the learners.

☐ The course must be structured in a way that educational material will be adapted to the pace of learning and the specific needs of the learners.

☐ The counseling and facilitating dimensions of the educator's role must be strengthened. Less emphasis should be placed on transmitting information, and more emphasis should be placed on developing students' skills.

☐ The learners must participate in the formative and summative evaluation of the course.

☐ The learners' experience in using the Web as a learning environment should be considered in structuring the content and the presentation of the learning material.

☐ In the planning of a course of e-learning instruction and exercises must be included that will provide learners with the appropriate skills needed to participate in the electronic classroom.

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