



Design and modeling of an online adult training system: The Importance of Adult Learner Modeling.

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Abstract. Our research work is in line with the perspective of designing, implementing and evaluating online adult education systems in a university context (e.g. continuing education). A synergy based on the alignment between adult learning strategies and distance learning strategies. Guided by the principles of pedagogical engineering and cognitive sciences, we analyze and compare in this draft work the models describing adult learning, the most cited in the literature, and then we deduce pedagogical and didactic suggestions to be taken into consideration when designing and modeling an adult learning system.

Key Words : Educational engineering, cognitive sciences, Adult learning, Modelisation system.

1 Introduction

Modeling the adult learner and modeling online adult learning devices are two related but distinct areas of adult learning. Modeling the adult learner refers to the creation of a theoretical or conceptual model of the adult learner, which takes into account their characteristics, motivations, experiences, needs and learning preferences. This modeling makes it possible to better understand the cognitive and emotional processes involved in adult learning, and thus to develop more effective teaching strategies.

Modeling of online adult learning devices refers to the creation of models to design, develop and evaluate online adult learning devices. This involves considering the characteristics of adult learners as well as the tools and technologies available to create effective online learning environments. The modeling of online training devices can also include aspects such as instructional design, content selection, learning management, interaction between learners and teachers, evaluation and adaptation of the device.

In sum, modeling the adult learner is an essential step in designing effective online adult learning devices, as it helps to better understand the characteristics and needs of the adult learner. The two modeling domains are therefore closely related and complementary in the design of online learning environments for adults.

In addition, the objective of this paper is to compare different studies on explanatory models of learning in adults and their applications and to identify the different useful elements for the design of an adult training device in online in a university setting.

The major problem of these digital training systems or devices lies in their andragogic and didactic relevance, and in their alignment on the one hand with adult learning models, and on the other hand with models of learning situations. , formal, informal, non-formal or in a work situation.

2 Methodology

We have adopted the comparative analysis method. A systematic approach that consists of examining the strengths and weaknesses of each model and deducing practical suggestions for the design of a relevant and aligned training system. We studied 20 recent publications (2020 – 2023) relating to the experimentation of the adult learning models most cited in the literature. Some of these studies are in themselves meta analyzes of numerous research articles published between 2000 and 2020.

3 Results And Discussion

Research on adult learning has a long history dating back to the beginning of the 20th century. However, early studies often focused on the physiological and psychological characteristics of learning adults, rather than the learning processes themselves.

The beginning of research into adult learning as a distinct field of research has been attributed to Malcolm Knowles, who developed the concept of andragogy in the 1950s. Knowles proposed that adult learning is different from that of children because of their prior experience, goal orientation, self-reliance, intrinsic motivation, and problem-solving orientation.

Since then, many researchers have contributed to the understanding of adult learning, studying the different learning models, the factors that influence motivation and participation in training, effective teaching strategies for adults and the impacts of lifelong learning on adult well-being and development.

Today, adult learning research is an interdisciplinary field that encompasses contributions from psychology, sociology, education, vocational training, and human resource management.

The comparative analysis of the 6 adult learning models most cited in the literature, namely: Knowles' andragogical model, the self-directed learning model, the transformational learning model, the cognition model located, the experiential model of Kolb and the connectivism model of Siemens, allowed us to identify the strengths and weaknesses of each model (table 1), to make the superposition to deduce certain elements or factors (table 2) which must be taken into consideration upstream of any design of an adult training system, particularly in distance learning mode.

Table 1. Strong points and Weaknesses of each adult learning model

Model	Strong points	Weaknesses
Knowles' Andragogy	<ul style="list-style-type: none"> Recognizes the importance of self-directed learning and learner autonomy Emphasizes the need to connect new learning to prior experience and knowledge Emphasizes the relevance and practicality of learning for adult learners 	<ul style="list-style-type: none"> Assumes that all adult learners are self-directed and motivated, which may not be the case for everyone May not account for the differences in motivation and learning styles among adults from different cultures or backgrounds
Self Directed Learning	<ul style="list-style-type: none"> Flexibility: Learners have the freedom to decide what and how they want to learn. Personalization: Learners have the flexibility to tailor their learning to their own interests, needs, and learning style. This can increase their motivation and engagement in the learning process. Autonomy: Learners take control of their own learning, which can increase their sense of ownership and 	<ul style="list-style-type: none"> Lack of structure: can be challenging for some learners who prefer a more structured learning environment. Time management: This can be difficult for some learners who struggle with time management. Lack of motivation: Learners may not be able to identify their own learning goals or develop effective learning strategies. Limited guidance: may not provide learners with the same level of guidance and support

<p>Mezirow's Transformative learning</p>	<p>responsibility for their learning outcomes.</p>	<p>This can be challenging for learners who require more guidance.</p>
	<ul style="list-style-type: none"> • Lifelong learning: emphasizing continuous lifelong learning. • Problem-solving skills: can improve their problem-solving skills. 	<ul style="list-style-type: none"> • Assessment: Without formal assessments, it can be challenging to determine whether learners have achieved their learning goals.
<p>Cognition situated adult learning (SCAL)</p>	<ul style="list-style-type: none"> • Emphasizes the role of critical reflection and dialogue in changing perspectives and beliefs • Recognizes the emotional and cognitive aspects of learning • Encourages learners to become agents of change in their lives 	<ul style="list-style-type: none"> • May not be applicable to all types of learning or situations • Requires a high level of self-awareness and willingness to engage in self-reflection
	<ul style="list-style-type: none"> • Real-world relevance: This makes it relevant to the real-world and increases the likelihood that learners will be able to transfer what they have learned to new situations. • Social interaction: It highlights the role of peers, mentors, and experts in providing support and guidance to learners. • Reflective practice: This can help learners to develop a deeper understanding of the content they are learning. • Learner-centered: The CSAL model is learner-centered, which means that it takes into account the unique needs, experiences, and perspectives of each individual learner. This can help to increase learner engagement and motivation. 	<ul style="list-style-type: none"> • Limited focus on individual differences: It does not take into account the impact of cognitive, personality, or emotional factors on learning. • Complex implementation: It may be difficult for educators to create learning environments that fully support the principles of the model.
<p>Klob's experiential</p>	<ul style="list-style-type: none"> • Provides a hands-on approach to learning • Encourages reflection and critical thinking • Acknowledges that learning is a continuous and ongoing process 	<ul style="list-style-type: none"> • May not be practical or feasible for certain types of learning, such as theoretical or abstract concepts • May require a higher level of resources and support
	<p>Siemens' Connectivist</p>	<ul style="list-style-type: none"> • Emphasis on collaboration and networking: This encourages learners to seek out new connections and learn from their peers, rather than relying solely on traditional educational institutions. • Focus on technology: This means that learners can use a variety of digital tools to enhance their learning experience, from online forums to social media platforms. • Flexibility: This means that learners can learn at their own pace and in their own way,

- without being restricted by a rigid curriculum or timetable.
- Emphasis on lifelong learning: encourages learners to continue learning throughout their lives, rather than viewing education as something that only happens in the early stages of life.
- of connections at the expense of other factors, such as individual learning styles and needs.

Table 2. Methodological suggestions

Model	Methodological suggestions
Knowles' Andragogy	<ul style="list-style-type: none"> • Engage adult learners in the learning process: You can achieve this by using participatory learning activities such as group discussions, brainstorming sessions, and problem-solving exercises. • Encourage learners to share their experiences and insights, and incorporate their feedback into learning activities. Consider using collaborative tools such as online forums, chat rooms, and video conferencing to facilitate communication and collaboration. • Provide self-directed learning opportunities: To facilitate self-directed learning, provide learners with resources such as books, videos, and online courses that they can explore at their own pace. Encourage them to set their own learning goals and reflect on their progress. • Use real examples and scenarios: Use real examples and scenarios to help learners understand how concepts they can apply in practice. • Provide timely feedback: Use feedback to identify areas where learners need additional support.
Self Directed Learning	<ul style="list-style-type: none"> • Establish clear learning objectives: Before embarking on any learning journey, it's essential to establish clear learning objectives. These objectives should be specific, measurable, achievable, relevant, and time-bound (SMART). This will help adult learners stay focused and motivated as they work towards their goals. • Provide guidance and support: As an instructor or facilitator, you can provide resources and tools that help learners achieve their objectives. You can also offer advice and feedback, answer questions, and help learners stay on track. • Encourage collaboration: Encourage adult learners to form study groups, participate in online forums or discussion boards, or attend seminars or workshops. Collaborating with others can help learners gain new perspectives, share ideas, and gain support and encouragement. • Use a variety of learning resources: Self-directed learners should have access to a wide range of learning resources, including textbooks, articles, videos, podcasts, and online courses. Using a variety of resources can help adult learners stay engaged
Mezirow's Transformative learning	<ul style="list-style-type: none"> • Encourage critical reflection: This can be done through journaling, group discussions, or one-on-one coaching sessions. This reflection will help individuals to identify their assumptions and biases, and begin to challenge them. • Create a safe and supportive learning environment: This can be done by establishing ground rules for respectful communication and by providing opportunities for peer support.

**Cognition
situated adult
learning
(SCAL)**

- Foster dialogue and exchange: This exchange can help individuals to broaden their understanding of the world and consider alternative viewpoints.
- Promote action and implementation: Transformative learning should not stop at reflection and dialogue. Adults should be encouraged to take action and implement changes in their personal and professional lives. This can include advocating for social justice, developing new skills, or pursuing further education.
- Provide ongoing support: Transformative learning is a lifelong process, and individuals will need ongoing support to continue to grow and develop. This can be done through continued dialogue, coaching, and access to additional learning resources.
- Consider the context: When designing an adult education or training program, it's important to consider the specific context in which the learning will take place. This includes the environment, the available resources, and the social and cultural factors that may impact learning. A cognition situated model can help you take these contextual factors into account and design a program that is more effective for the learners.
- Emphasize experiential learning: A cognition situated model emphasizes the importance of learning through experience and active engagement with the environment. To apply this model to adult education or training, you can incorporate experiential learning activities, such as simulations, role-playing, and problem-solving exercises. These activities should be designed to help learners apply what they're learning in a practical, real-world context.
- Promote reflection: Reflection is an important part of the cognition situated model, as it helps learners to make sense of their experiences and integrate new knowledge into their existing schemas. You can promote reflection in adult education or training by incorporating reflective writing exercises, group discussions, or other activities that encourage learners to reflect on what they've learned and how it applies to their lives.
- Foster collaboration: Collaboration is another key element of the cognition situated model, as it recognizes the importance of social interaction in learning. To apply this model to adult education or training, you can incorporate collaborative learning activities, such as group projects or discussions, that allow learners to work together and share their knowledge and experiences.
- Use authentic assessments: In a cognition situated model, assessments should be designed to measure the learner's ability to apply what they've learned in a real-world context. To apply this model to adult education or training, you can use authentic assessments, such as case studies or project-based assessments, that require learners to demonstrate their knowledge and skills in a practical, real-world context.

**Klob's
experiential
model**

- Identify the learning style preferences of your adult learners: The Kolb model suggests that individuals have different learning style preferences - concrete experience, reflective observation, abstract conceptualization, and active experimentation. Understanding the learning style preferences of your adult learners can help you design learning experiences that cater to their individual needs.
- Design learning experiences that incorporate all four stages of the Kolb model: The Kolb model suggests that learning is a cyclical process that involves four stages - concrete experience, reflective observation, abstract conceptualization, and active experimentation. Designing learning experiences that incorporate all four stages can help ensure that your adult learners have a well-rounded learning experience.
- Use a variety of teaching methods: The Kolb model suggests that people learn best when they are exposed to a variety of

teaching methods. Consider incorporating a range of teaching methods into your adult education program, such as lectures, group discussions, case studies, and hands-on activities.

- Encourage reflection: Reflection is an important part of the Kolb model, as it allows learners to process their experiences and develop new insights. Encourage your adult learners to reflect on their learning experiences and provide opportunities for them to share their reflections with others.
- Emphasize the importance of application: The final stage of the Kolb model is active experimentation, which involves applying what has been learned to real-world situations. Emphasize the importance of application in your adult education program, and provide opportunities for learners to apply what they have learned in practical settings.
- Encourage adult learners to build personal learning networks (PLNs) by connecting with others who have similar interests or expertise. This can be done through social media platforms, online forums, or professional associations.
- Create online communities of practice where adult learners can connect with peers, share resources, and collaborate on projects. These communities can be facilitated through learning management systems, online discussion forums, or social media platforms.
- Provide access to a range of digital tools and resources that enable adult learners to engage in self-directed learning. This might include e-books, podcasts, videos, blogs, and online courses.
- Encourage adult learners to engage in reflective practice by regularly reviewing and evaluating their learning experiences. This can be done through journaling, blogging, or engaging in peer feedback and evaluation.
- Use social and collaborative learning activities to foster knowledge sharing and co-creation. This might include group projects, online discussions, or collaborative writing assignments.

**Siemens'
Connctivist**

4 Conclusion

In conclusion, the use of adult learning models is essential for designing effective online programs and training for adult learners. By incorporating practical elements, opportunities for collaboration, tailoring learning to learner experience, regular feedback, flexible training, and varied instructional materials, designers can create programs that meet learners' needs. adults and enable them to achieve their learning goals. Ultimately, the success of adult learners depends on the quality of the design of programs and courses, as well as the relevance and quality of the learning content offered.

By using a variety of teaching materials to meet the needs of different types of learners, online programs and training can be designed to be effective and engaging for adult learners. In sum, by considering adult learning models, you can create online programs and training that are relevant, useful, and effective for adult learners. We can use a mixed model that crosses the advantageous suggestions of the 6 models cited in this study for create online programs and training that are relevant, useful, and effective for adult learners.

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