




Digital andragogy: the need to know and the role of experience in an online Master's degree

Andragogía digital: necesidad de saber y papel de la experiencia en un Máster universitario en línea

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ABSTRACT

The current high demand for online learning, the high drop-out rates, and the heterogeneity of students taking online master's degrees call for attention to be paid to the different profiles and their different ways of learning. Andragogy provides a theoretical framework for understanding adult learning, although its principles need to be revisited from the perspective of online learning and through the lens of today's learners themselves. This study aims to understand learners' self-identification with the adult learning principles of Knowles' andragogy. Specifically, it focuses on two of the principles of this theory: the need to know (NK) and the role of experience (RE). A mixed method approach was employed: a descriptive and inferential quantitative analysis of a questionnaire was complemented by a qualitative analysis of interviews. A questionnaire was designed, validated, and completed by 245 postgraduate students, and the correct reliability of the instrument was analysed. In addition, 5 interviews were carried out with students on items of the questionnaire. The results show statistically significant differences in the RE according to previous work experience in education, but no differences are found in the preferences for the learning strategies analysed related to the NK and RE principles of andragogy according to gender, age, or work situation. In conclusion, the validity of the NK and RE andragogical principles for online learners in the 21st century is defended.

Keywords: adult learning theory; online education; higher education; andragogy, student profile; learning strategies.

RESUMEN

La alta demanda actual de formación en línea, las elevadas tasas de abandono y la heterogeneidad del alumnado que cursa másteres en esta modalidad, reclama poner atención en los distintos perfiles y sus diferentes formas de aprender. La andragogía provee un marco teórico para comprender el aprendizaje de las personas adultas, aunque es necesario visitar sus principios desde la formación en línea y a través de la lente de los propios estudiantes actuales. El objetivo de este estudio es conocer la autoidentificación de los estudiantes con los principios del aprendizaje adulto de la andragogía de Knowles. En concreto, se centra en dos de los principios de esta teoría: la necesidad de saber (NS) y el papel de la experiencia (PE). Se empleó un método mixto: un análisis cuantitativo descriptivo e inferencial de un cuestionario se complementa con un análisis cualitativo de entrevistas. Se diseñó y validó un cuestionario que cumplimentaron 245 estudiantes, y se analizó la correcta fiabilidad del instrumento. Adicionalmente, se llevaron a cabo 5 entrevistas al alumnado sobre ítems del cuestionario. Los resultados muestran diferencias estadísticamente significativas en el PE en función de la experiencia laboral previa en educación, pero no se encuentran diferencias en las preferencias por las estrategias de aprendizaje analizadas relacionadas con los principios NS y PE de la andragogía en función del género ni la edad ni situación laboral. Como conclusión, se defiende la vigencia y validez, de los principios andragógicos NS y PE para el alumnado en línea del siglo XXI.

Palabras clave: teoría del aprendizaje adulto; enseñanza en línea; educación superior; andragogía, perfil estudiantil; estrategias de aprendizaje.

INTRODUCTION

In the current context of distance higher education, characterized by the plurality of student profiles, the focus of academics has shifted from accessibility of training to pedagogical innovation (Lee, 2017), quality of training (Smidt et al., 2017), maximizing learning (Kleinke & Lin, 2020) and minimizing dropout (García Areito, 2019), which is 21.8% according to the Ministry of Universities of the Government of Spain (2023).

According to Ferreira and Mclean (2017), one of the main causes of high dropout is that instructional design does not consider how the diverse characteristics of adult learners who choose distance and online learning are distributed. Knowles (1980, 1990) is considered the father of *andragogy*, popularizing the term during the 1960s and 1970s to name adult education as opposed to pedagogy. Although his claim to construct a general theory to guide the practice of adult educators has been criticized for forgetting “the big three”: class, gender, and ethnicity (St. Clair & K pplinger, 2021), it remains for many educators a theoretical frame of reference.

Concerning gender, criticisms of Knowles' andragogy theory claim that women have specific characteristics that would affect their learning style and that is not reflected in the theory (Merriam, 2001). Online learners are predominantly female, employed, and older than traditional university students (Tainsh, 2016), so the online mode would be of particular relevance to test the validity of the theory's assumptions and its alleged gender bias.

According to Donavant (2009), it is true that andragogy is not a panacea for adult education practices, but its usefulness for a better understanding of adult learning should not be ignored. As Knowles (1980) foresaw, new information and communication technologies have made possible the creation of collaborative learning environments and interaction, both with a large amount of content, with the learning facilitator and among learners.

However, andragogy was developed for face-to-face instruction, so online learning must revisit it (Arghode et al., 2017; Blackley & Sheffield, 2015; Kennan et al., 2018) to develop a digital andragogy that responds to the learning needs of today's adult learners who choose online learning in the 21st century.

Numerous studies have analysed the impact on academic outcomes and student satisfaction of using andragogy in university teaching and continuing professional development (Akintolu & Letseka, 2021; Aljohani & Alajlan, 2021; Kamışlı &  zonur, 2017; Kleinke & Lin, 2020; Sato et al., 2017; Velardi et al., 2020; Youde, 2018; Watts, 2018). Kennan et al. (2018) explored different preferences for teaching performances as a function of social status and age within andragogy. However, a deficit of research has been identified in the Spanish context within the framework of adult education theory, or andragogy, on the practices of online learning that best suit the specific needs of learners, possible differences in terms of age and gender, as well as the use of andragogical principles (Rodrigo et al., 2024) as a reference for developing didactic strategies.

It is therefore considered relevant to explore a theory of adult learning in 21st-century digital environments that guides both the meaning of LMS (Learning Management Systems) design and teaching practices and research on the improvement and effectiveness of online student learning (Sun & Chen, 2016).

This research explores two of the principles that Knowles (1980, 1990) characterizes adult learning: the *need to know* (NK) and the *role of experience* (RE) as a basis for possible methodological strategies in the “Postgraduate Certificate in Education” (PGCE) at an online university and how these teaching preferences are distributed among learners according to age, gender, employment status and previous experience in the sector.

Online University Students: Traditional and Non-traditional Learners

A defining characteristic of online university education is the heterogeneity of its students in terms of age, life and professional experiences and interests. The characteristics of adult learners is one of the most researched topics in distance education, and has led to the classification of its students as traditional and non-traditional (Martin et al., 2020) with age as the most common classification criterion. However, it is prior knowledge and work experience that actually defines non-traditional students (Carreira & Lopes, 2019).

In the context of university education, traditional students are those who have continued their studies uninterruptedly until they reach postgraduate education. Therefore, they would be in the age range 24–26 years; while non-traditional students are those over 26 years of age who have returned to their studies after a more or less prolonged period of time away from the academic environment and who are usually employed (de Abreu, 2020; Deschacht & Goeman, 2015; Kleinke & Lin, 2020).

Some of the advantages that online and distance learning provides for adult learners is that they can enjoy greater time flexibility when juggling work, study, hobbies, and family responsibilities (de Abreu, 2020; Deschacht & Goeman, 2015), but time flexibility does not mean more time for learning, so it is important to understand the strategies that learners use to adapt to the online learning environment.

Non-traditional students tend to relate more to faculty members, value faculty more positively, and show greater behavioural and cognitive engagement (Lee, 2017; Vuori, 2019), while traditional students prioritize relationships with peers (de Abreu, 2020; Vuori, 2019). According to Lee (2017), today's students are customer service-oriented, resource-demanding and credential-oriented; these “consumer learners” tend to be less patient when they encounter drawbacks in their learning, and have higher demands for institutional services to match their needs on the basis that their education is an investment of time and money; non-traditional distance learners tend to be grateful for the educational opportunities provided, respectful of providers and compliant with established systems.

In general, highly educated students tend to express lower satisfaction with web-based distance education (Ke & Kwak, 2013). The main motivation for obtaining a PGCE for younger students is instrumental, to improve employment prospects (de Abreu, 2020; Liu & Morgan, 2018), while for older students, career reorientation or self-fulfilment would be more important (de Abreu, 2020; Carreira & Lopes, 2019). Soft skills, such as communication and time organization acquired through work experience, are more common characteristics for non-traditional students (Carreira & Lopes, 2019). In general, mature students want courses that are well-designed, so that they can improve their chances of successful completion (Sun & Chen, 2016).

Andragogy in the Practice of E-Learning: The Need to Know and the Role of Experience

Knowles (1980) described five principles that supposedly define adult learners and differentiate them from children and young learners:

1. Self-concept: As a person matures, the self-concept changes from a dependent personality to a self-directed person and therefore expects to be treated as such.
2. Role of experience: As a person matures, he or she accumulates a growing reservoir of experience as a resource for learning.
3. Willingness to learn: as a person matures, his or her willingness to learn becomes increasingly oriented toward real-life social role development tasks.
4. Learning orientation: as a person matures, his or her time perspective changes from a postponed application of knowledge to an immediate application and, consequently, his or her learning orientation changes from one that is subject centred to one that is oriented to real life or career problems.
5. Intrinsic motivation: as a person matures, the motivation to learn is internal, although it may coexist with some external motivators.

These principles were not intended to be universal, “but rather a continuum of assumptions to be tested in terms of suitability for particular learners in particular situations” (Knowles, 1980; p. 391). In the case of students enrolled in an online PGCE, it is assumed that they possess a range of qualities such as self-motivation, confidence, time management skills, financial resources, and technological competence necessary for success in an online environment (Lanford, 2020). Donavant (2009) points out another factor that is worth noting in the context of this research, which is that when adult education is compulsory, such as the PGCE qualification for teaching, it often leads to anger, lack of motivation, and a sense of disenfranchisement. In the specific case of the PGCE, the motivation factor is also affected by the fact that prospective teachers typically undervalue the psycho-pedagogical knowledge provided by the PGCE compared to their academic specialism and experience (Pontes et al., 2010).

Adult Learners' Need to Know

According to Knowles (1980), pedagogy assumes that the learner only needs to know that he/she must learn what the teacher teaches if he/she is to pass or be promoted, and not how he/she will apply what he/she learns in his/her life. In contrast, andragogy considers that the adult person needs to know why they need to learn something before they start learning, and how they can use it in their real life. Consequently, the learning facilitator must help the learner to be aware of the need to know what he or she intend to teach (Knowles, 1980). The perception of a high level of relevance in the learning environment is the most powerful determinant of satisfaction with online courses (Ke & Kwak, 2013).

Ferreira and Mclean (2017) note that adult online learners are characterized by a drive for immediate access to the benefits derived from their learning, and a desire to quickly apply these benefits to career advancement and other personal goals; they lack

patience and need to be given reasons why the path to desired learning goals may be longer and more arduous than expected.

Therefore, instructional design must align learning objectives with the learner's real-world needs (Ferreira & Mclean, 2017). The “learning facilitator” (Knowles, 1980) must help the learner connect the course content to the work environment (McCauley et al., 2017). Given the profile of this learner, in terms of work and family situation, they need to plan their study engagement effectively (Sun & Chen, 2016), and select the resources they will use to optimize their learning, so it may be important at the beginning of the course to brief students on key information (Youde, 2018), as well as express clear expectations to adult learners to enable their planning (Schultz, 2012).

Adult learners do not want surprises, they want to know at the outset what is expected of them, and what they can expect from the teacher (Bailey & Card, 2009). Knowing the structure of the course at the outset is one of the factors that affect adult learners' satisfaction; the more time they invest in finding out how it is structured, the less time and energy they use to learn the content, according to Trammell and LaForge (2017).

In summary, andragogy asserts that the adult needs information in three areas: how learning will take place, what learning will take place, and why learning is important (Knowles et al., 2020).

The Role of Experience as a Resource for Learning

According to Knowles (1990, p. 31): “Experience is the richest resource for adult learning; therefore, the main methodology of adult education is the analysis of experience”. For pedagogy, the learner's experience is of little value for learning; the experience that counts is that which the teacher helps to generate and the didactic resources he or she selects. On the contrary, adults come to the learning situation with a large volume and different quality of experience than children and young people (Knowles, 1980). This implies, on the one hand, that the adult learner group is more heterogeneous in terms of motivation, interests, and goals and, on the other hand, that for some types of learning the richest resource may lie in the learner himself/herself, in his/her experience and prior knowledge which can be used to enhance the learning process (Kleinke & Lin, 2020).

Knowles et al. (2020) consider the adult learner's experience as a resource from which to draw information, relate it and apply it to study material, so teaching will be more effective if it is based on the adult's experience. Therefore, the adult learner's life and professional experience are significant starting points for planning university studies (Valli et al., 2017). Adult learners actively seek to apply their experiences in a practical context (Kleinke & Lin, 2020).

However, not all prior experience is of equal value for highly specialized and technical learning. Prior knowledge, and students' experience in the work sector covered by the PGCE, may be an advantage regarding conceptual mastery and practical problem-solving strategies compared to experience gained in other fields of knowledge, making the material more relevant for the former than for the latter, who would need a higher degree of guidance from the lecturer (van Riesen et al., 2018).

METHODOLOGY

This study is part of the project *Digital Andragogy in the 21st Century*. Specifically, this study focuses on the analysis of two of the andragogical principles proposed by Knowles (1980): the *need to know* (NK) and the *role of experience* (RE). The objectives of this study are: 1st To test the theoretical validity of these two principles of Knowles' theory through 21st century online learners' evaluations of the different didactic strategies that relate to these principles; 2nd To identify whether there are significant differences in terms of different age groups' valuation of these strategies, and the relationship with their experience and employment status (whether they are currently employed or not) and 3rd To explore gender differences in these preferences.

To achieve these objectives, a mixed method is used, starting with a quantitative method (questionnaire), followed by a qualitative method (interview) involving a more detailed exploration with a few individuals (Creswell, 2009).

Participants

The research was approved by the university's ethics committee. The sample consisted of online PGCE students from a private Spanish university. The socio-economic level of the students is between medium and medium-high. The questionnaire was presented to the students in the virtual face-to-face sessions and in the platform's forums during the second semester of the 2021-2022 and 2022-2023 academic years, to a total of 470 students, of which 245 completed the questionnaire. The university's pedagogical model promotes self-directed learning with the guidance of the teaching staff, who work from online forums and sessions, whose recordings are stored in the LMS. In addition, students also have access to a syllabus with the basic content of the subjects and various teaching aids such as complementary texts and audiovisual resources. Table 1 shows the demographic data of the sample.

Table 1

Demographic data of the questionnaire sample

		%	Number of cases
Gender	Woman	67,34	165
	Man	31,83	78
	Other	0,81	2
Age (N=244) *	>25	14,75	36
	26-45	71,72	175
	<45	13,52	33
Previous Studies	Health Sciences	23,67	58
	Engineering	28,16	69
	Humanities	11,83	29
	Life Sciences	13,46	33
	Social Sciences	18,36	45
	Math	1,63	4
	Architecture	2,85	7
Any related job?	No	79,18	194
	Yes	20,81	51

Note: Composed by the authors. One of the students didn't answer about his/her age.

Only 14.75 % of the student body in the sample can be considered traditional according to the age criterion. Most of the sample is female (67.34%).

As a complement to the questionnaire, individual online interviews were conducted with five students who were in their second semester in the academic year 2022-2023, which in practice means that they have successfully completed all subjects of the PGCE. The demographics of this group are shown in Table 2.

Table 2
Demographics of the interview sample

Student	Age	Gender	Qualification	Employed	Experience in Education
A1	42	M	Telecommunications Engineering	Yes	No
A2	26	F	Social Education	Yes	Yes
A3	32	F	Social Work	No	No
A4	27	M	Social Work	Yes	No
A5	26	M	Industrial Design and Product Development Engineering	Yes	No

Note: Composed by the authors.

Instrument

For this research a questionnaire was designed (CAIPA-v1; Questionnaire of Self-identification with Andragogical Principles), which consists of two sections: the first one collects demographic data of the sample, the second one is made up of 19 questions oriented to know the student's self-identification with Knowles' andragogical principles. The response options are graded on a four-value Likert scale to avoid central tendency bias: 1- Strongly Disagree; 2- Disagree; 3- Agree; 4- Strongly Agree.

The Scale Content Validity Index (S-CVI) was applied to assess the relevance and representativeness of the questionnaire items, reaching an S-CVI/Ave of 98.61%, whereby, on average, a high percentage of the 6 experts who were consulted agreed with the relevance of each item. Additionally, an S-CVI/UA of 95.83% indicates that a considerable proportion of items received unanimous agreement from the experts. These indices exceed commonly accepted thresholds for confirming content validity, providing robust empirical evidence for the validity of the questionnaire (Haynes et al., 1995; Polit et al., 2007).

To determine the suitability of the data for exploratory factor analysis, a Kaiser-Meyer-Olkin test of sampling adequacy measure was performed, resulting in a KMO value=.82; additionally, Barlett's test of sphericity showed a $\chi^2=168.93$, $DoF=28$, $p<.001$, thus justifying the use of factor analysis with the sample data. Two eigenvalues greater than 1 were found (1st factor=3.47 and 2nd factor=1.05); these two main factors explain 56% of the total variance. Using a principal axis factor extraction method, with a Promax rotation and Kaiser normalization, the factor correlation matrix shows a value outside the main diagonal equal to .145, indicating a low correlation between factors. Table 3 shows a clear respective identification of each of the factors found.

Table 3*Terms of the factor structure of the questionnaire items*

Andragogical Principles	Questionnaire's Items	Structural Terms (PCA, Promax rotation)	
		1st. Factor	2nd. Factor
Need to Know (NK)	NK1: I think it is important to know at the beginning of the subject how the contents are related to the exercise of the profession.	,809	,175
	NK2: I consider it useful for the teacher to explain at the beginning of the subject the objectives, its structure, and how to approach it to optimize the time spent.	,798	,136
	NK3: The main didactic objective of this PGCE must be to prepare me to solve everyday problems that arise at work.	,796	,185
	NK4: I consider it useful that at the beginning of the subject the teacher explains what their online sessions will consist of, their teaching style and how the sessions will help me successfully pass the subject.	,620	,213
Role of Experience (RE)	RE1: The activities that are most useful for me to learn are the exercises in which I can apply knowledge and/or my experience.	,112	,605
	RE2: It helps me understand the syllabus when the teacher gives real-life examples that I can relate to my personal or professional experience.	,134	,601
	RE3: I positively value activities that make me reflect on my previous knowledge and experiences.	,139	,585
	RE4: Activities that present good professionals as models arouse my interest.	,218	,512

Note: Composed by the authors.

The feasibility of Cronbach's alpha reliability analysis is supported by the existence of an eigenvalue greater than 3 (Yurdugül, 2008) and by exceeding the minimum sample size ($22 < N = 245$). The latter has been calculated according to Bonett (2002) based on a null Cronbach's alpha value in the null hypothesis (CA_0), an expected Cronbach's alpha value $CA_{1E} = .7$, with 4 questionnaire items per construct, a type I error probability $\alpha = .05$, and a power of 90%. For the constructs of the need to know and the role of experience, Cronbach's alphas of $CA_{NK} = .85$ and $CA_{RE} = .79$ were obtained respectively, which are valid for research (Streiner, 2003).

For the present analysis, students were grouped into three age groups, traditional <25 years old, non-traditional 26–45 years old, and non-traditional >45 years old.

Responses are grouped and analysed according to Knowles' principles. For a detailed item-by-item analysis of the questionnaire, individual interviews were used.

For the design of the questions, the operational definition of the target principles of this study was as follows:

- NK: the adult learner needs to know before embarking on learning how the subject relates to the profession, what the objectives are, how the content is structured, how much time will be needed to complete it and what the online sessions will consist of and how they will support their learning.
- RE: the adult learner prefers activities that he/she can connect to real-life problems, that he/she can relate to his/her experience, and in which he/she can make use of it to acquire practical and reflective learning.

RESULTS

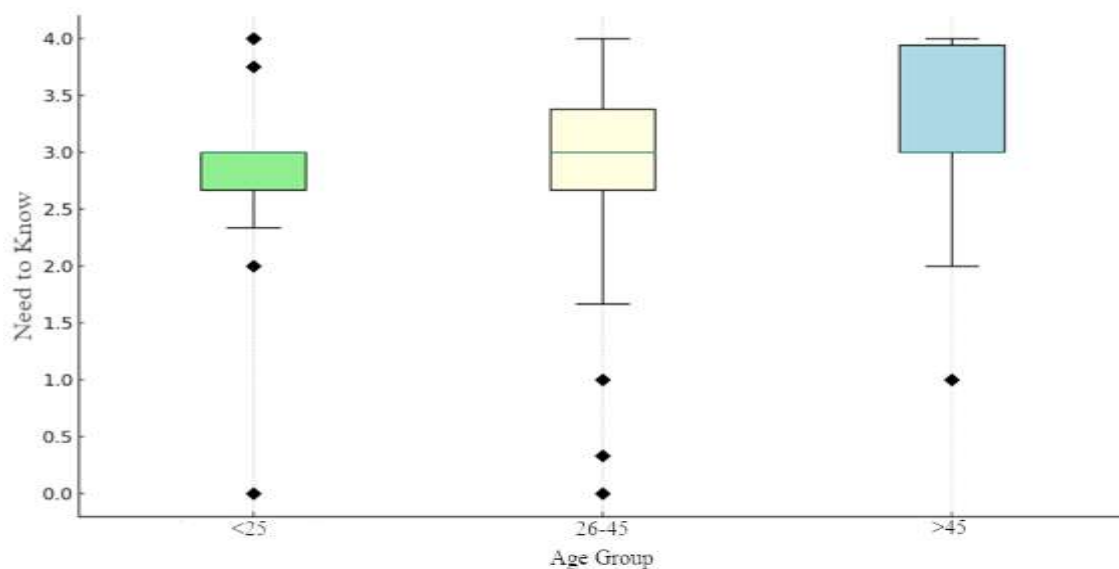
Descriptive and Inferential Analysis of the Questionnaire Responses

Using descriptive and inferential non-correlational statistics, the aggregated data from the CAIPA-v1 questionnaires of the non-experimental, retrospective, and cross-sectional research were analysed in the sample ($N=245$). The analytical tools used were SPSS version 29, and the Python libraries SciPy 1.11.1, and Matplotlib 3.7.2.

Figure 1 shows the distribution of the NK variable for each age group in the sample.

Figure 1

Distribution of NK by age groups



Note: Composed by the authors.

For the under 25 age group, most of the values are around the median 3, with a low dispersion ($SD=0.60$), which is seen in the interquartile range, which is the smallest of the three age ranges.

The group between 26 and 45 years shows a slightly wider distribution of values, with a median also around 3. However, this group has a higher dispersion ($SD=0.77$) compared to the group under 25 years, suggesting a higher variability in NK in this age group.

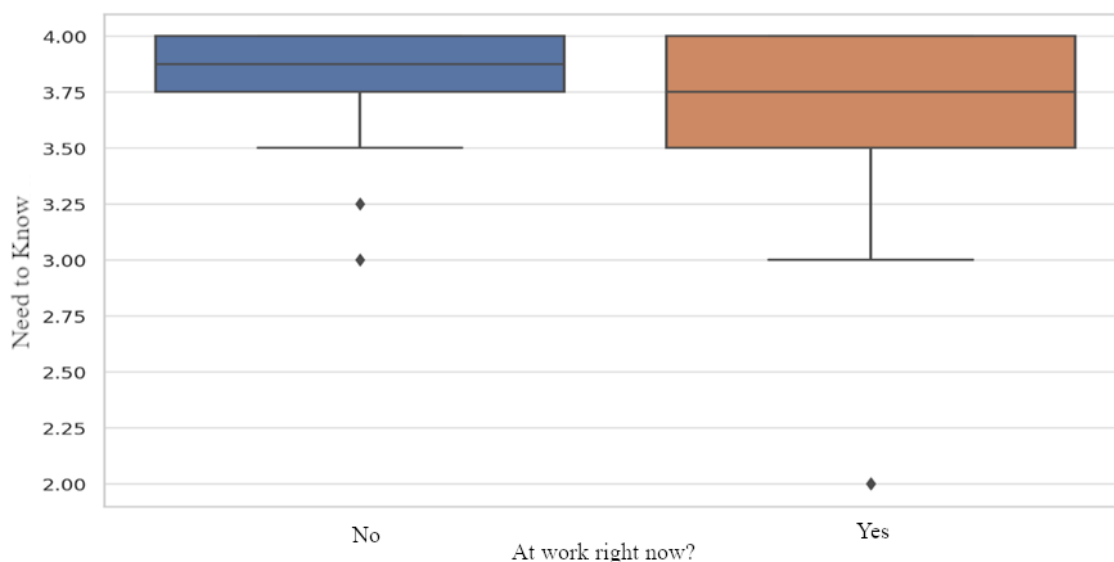
The group over 45 also shows a median of 3, but with a slightly higher dispersion ($SD=0.76$) than the group under 25, and close to that of the group between 26 and 45.

All age groups have a median NK of 3. This could indicate that the NK is similar in all age groups, although the variability of this need seems to be lower in the younger age group, which could imply a greater consensus for the traditional student group. However, there is not enough evidence to conclude that there is a significant difference in the NK between the different age groups, since by means of a Kruskal-Wallis test $H(n_{<25}=29, n_{26-45}=183, n_{>45}=34, p=.09)=4.76$ it can be concluded that no statistically significant differences in NK are found in the sample in the three groups.

Figure 2 shows that the median NK is high, close to 4. The interquartile range extends approximately from 3.5 to 4, indicating that the middle half of the employed persons' responses are in this range. However, the interquartile range is wider, which seems to indicate a higher variability in the responses of the unemployed; however, a Mann-Whitney test $U(n_{yes}=61, n_{no}=14, p=.50)=399$ indicates that it is not possible to state that there is a different distribution with statistical significance between the two groups in the analysed sample.

Figure 2

Distribution of NK according to employment status



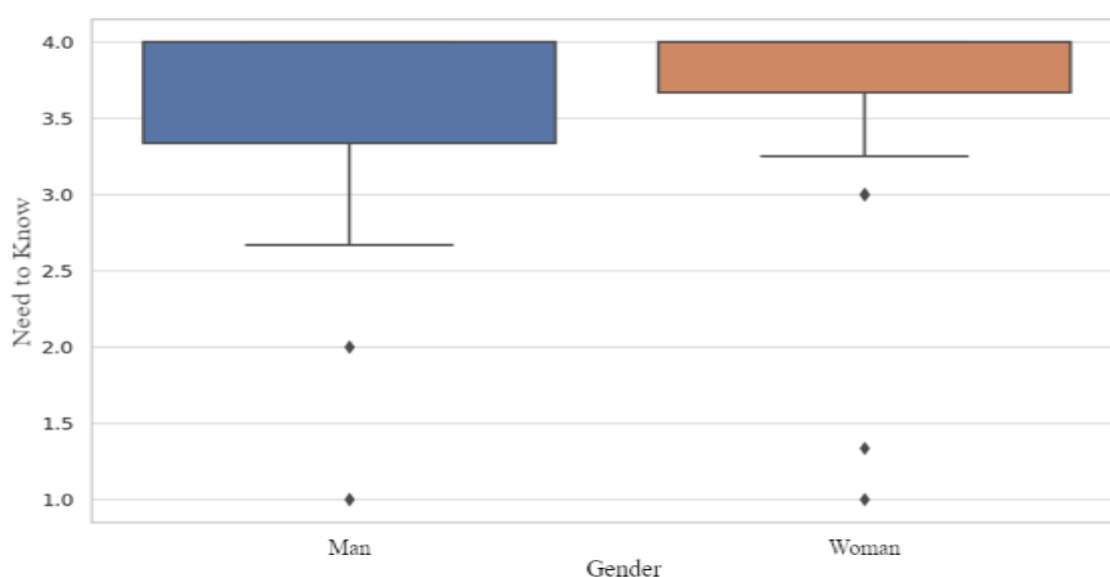
Note: Composed by the authors.

Figure 3 shows the comparison of responses on NK according to gender. Both groups show high NK. For males, the median is 4, and the interquartile range extends approximately from 3.33 to 4. For females, the median is also 4, and the interquartile range extends approximately from 3.67 to 4. According to the diagram, there seems to be a higher variability in the responses among males ($SD=0.82$) compared to females ($SD=0.42$).

However, a Mann-Whitney test $U(n_{\text{woman}}=165, n_{\text{man}}=80, p=.24)=6013.5$ indicates that it is not possible to state that there is a different distribution of NK with statistical significance between the two groups in the sample analysed.

Figure 3

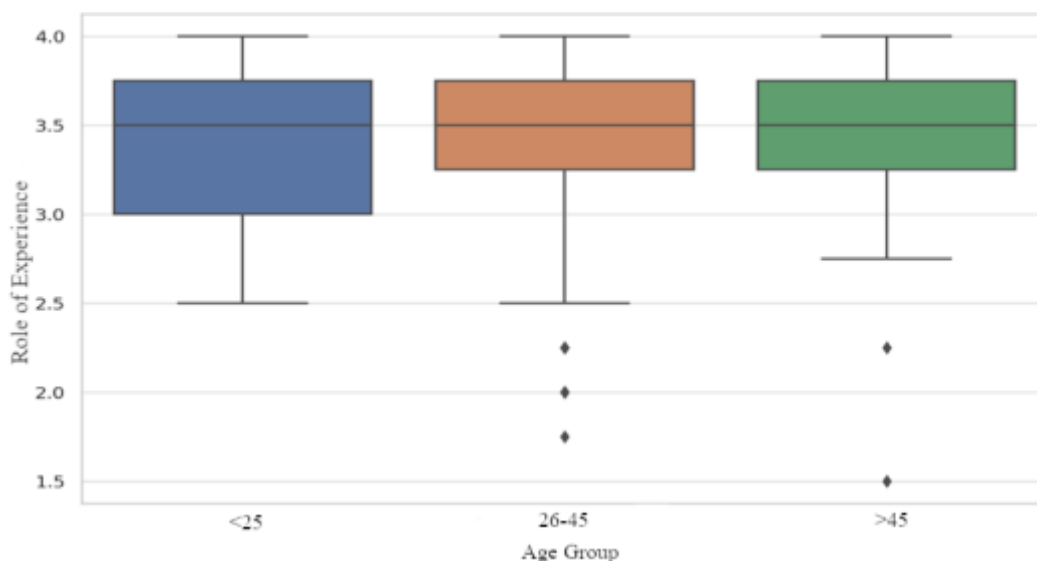
Distribution of NK according to gender



Note: Composed by the authors.

Figure 4 shows the RE between the different age groups. It can be seen that the three age groups show a similar distribution, with medians close to 3.5. It is interesting to note that the interquartile range is wider in the under-25 age group than in the other groups, which indicates a greater variability in the values within this age group, although its standard deviation is the smallest of the three groups ($SD=0.41$). On the other hand, the 26–45 and 45+ age groups show greater consistency in their responses, although they show larger deviations compared to the younger age groups, $SD=0.47$ and $SD=0.53$ respectively. In general, there does not seem to be a notable difference in the sample concerning RE between the different age groups, and by means of a Kruskal-Wallis test $H(n_{<25}=29, n_{26-45}=183, n_{>45}=34, p=.92)=0.16$ it can be concluded that no statistically significant differences can be found in the sample concerning the RE principle in the three groups.

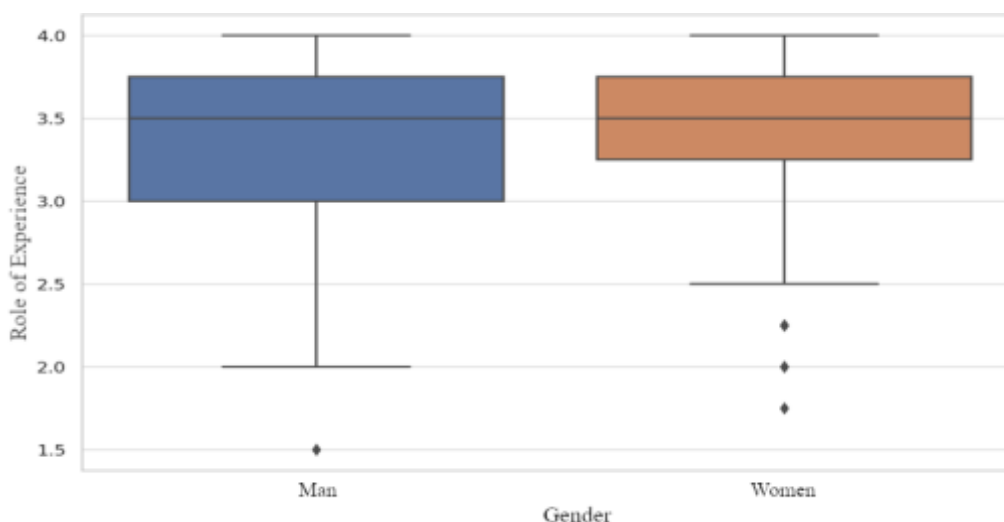
Figure 4
Distribution of RE between age groups



Note: Composed by the authors.

It can be seen in Figure 5 that both genders show a distribution of RE with medians of 3.5. The values in both genders vary mainly between 3 and 4, with some outliers. It is interesting to note that females have a somewhat narrower interquartile range than males, indicating a higher variability in males ($SD=0.49$) compared to females ($SD=0.46$). Overall, there does not seem to be a significant difference in SP between the different genders according to the sample observations, and a Mann-Whitney test $U(n_{\text{female}}=165, n_{\text{male}}=80, p=.63)=6930$ indicates that it is not possible to state that there is a different distribution with statistical significance between the two groups in the sample analysed.

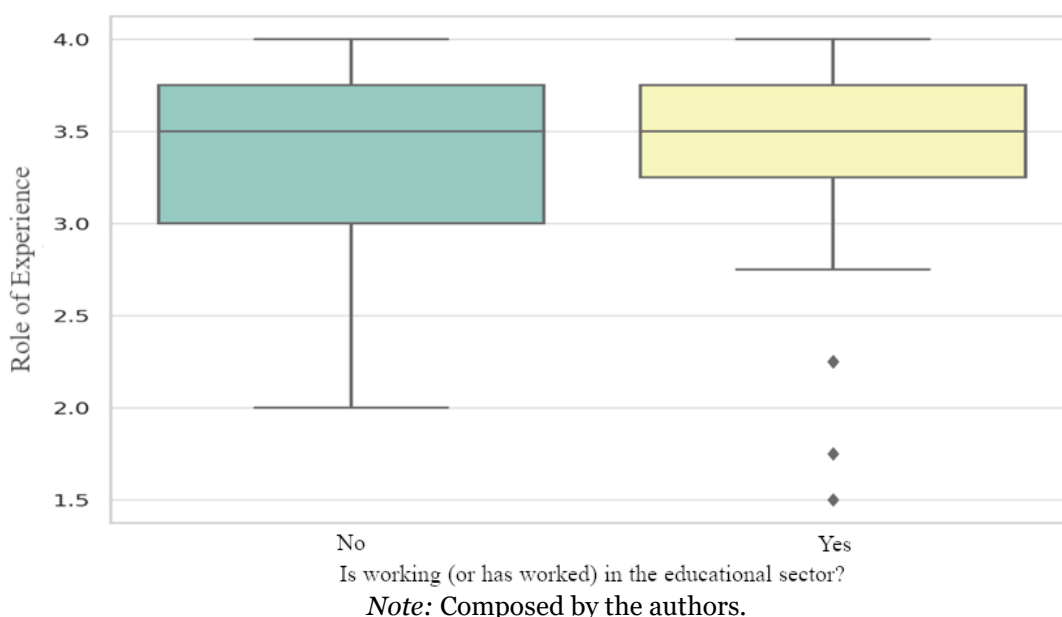
Figure 5
Gender distribution of the role of experience



Note: Composed by the authors.

Figure 6 shows the distribution of RE according to previous experience. The distribution of scores is quite similar for both groups: both have the same median, interquartile ranges, and dissimilar overall ranges. Using a Mann-Whitney test $U(n_{yes}=96, n_{no}=150, p=.04)=8296$, we can say that there is a different distribution with statistical significance between those who work or have worked in the sector and the group that does not work or has not worked in the sector. Those who do not work or have not worked in the sector indicate a lower average of the role of experience ($M=3.38, Mdn=3.5$) than those who work or have worked in the sector ($M=3.48, Mdn=3.5$).

Figure 6
RE according to previous experience in education



Interviews

To obtain more in-depth information about the responses to the questionnaire, a member of the research team conducted individual interviews with the five selected students who had previously agreed to participate. To keep to the interview time agreed with the participating students (20 minutes), one item had to be removed from the original instrument out of the four items that make up each principle analysed in this study. It was decided to eliminate the one that contributed least to the reliability of the quantitative instrument used (CAIPA-v1). The questions selected from the quantitative instrument show a Cronbach's alpha $CA_{NK} = .787$ and $CA_{RE} = .752$.

The interviews were conducted online via *Adobe Connect*. The students were asked to rate the degree of agreement with the statement contained in the item according to the Likert scale, and to elaborate an explanation of why and/or how the situation in the corresponding item occurs in their case. The researcher then verified the response by obtaining a synthesis for transcription. Table 4 shows a selection of the most significant comments on the NK principle items.

Table 4*Results of the interviews on the items corresponding to the NK principle*

Questionnaire items	Valuation	Comments to the items
1. I think it is important to know at the beginning of the course how the contents relate to the practice of the profession.	A1 - 3	"The legislation, the curriculum, the organizational documents... it doesn't matter so much that it's at the beginning as that it's being done. The virtual learning environments, and the technologies, have helped me and were very present in the master's degree".
	A2 - 4	"How the school is organized with the organizational documents (PEC, ...) thanks to this I have been able to collaborate in their elaboration in the school. I already knew what it was like to study by distance learning, and this has helped me to organize myself".
	A3 - 4	"It helps me to make logical sense of the subject and to find motivation in it".
	A4 - 4	"It makes sense of the content and that helps me to memorize and makes me less lazy".
	A5 - 4	"It gives you a context of possibilities and tools that you have to be able to practice".
2. I consider it useful for the teacher to explain at the beginning of the subject the objectives, its structure, and how to approach it to optimize the time devoted to it.	A1 - 2	"The objectives are already set, I think it is more important the timing and the structure, the methods, the practice, or theory, the work to be handed in".
	A2 - 3	"To optimize time, it seems significant to me the structure and the activities to be delivered, to organize yourself at your own pace".
	A3 - 4	"It helps me to organize my time".
	A4 - 4	"It's good because the people who work online help you to outline in your mind to get an idea of what it's going to take to study the subject. It's basic".
	A5 - 4	"It allows me to approach the subject more efficiently".
3. The main didactic objective of this master's degree is to prepare me to solve everyday problems in the profession.	A1 - 2	"You will be prepared to have an overview, to be comfortable, to be able to understand how a centre is structured, it goes beyond problem-solving, it's not all about problems".
	A2 - 2	"The master's degree provides basic theoretical knowledge, not only to solve problems, but also to prevent them".
	A3 - 2	"Everyday difficulties are a small part of the teaching profession".
	A4 - 2	"The problems are more for practice, and when it's your turn to be a teacher. Every school, classroom, and region is different, you learn these issues with experience".
	A5 - 3	"Agreed, but not the main objective, but also the general way of dealing with the profession, teaching, evaluation, etc."

Note: Composed by the authors.

In the answers to item 1 (relation of the contents to the profession), the terms “meaning” and “context” (A3, A4, A5) stand out.

In the responses to item 2 (information on structure and how to approach it), students emphasize the importance of knowing the structure and timing. Particularly, it seems important to know at the beginning of the subject the amount and timing of continuous assessment activities, which allows them to deal with it more efficiently by making work and study compatible.

Question 3 (the main objective of the PGCE is to learn to solve problems) was the question with the highest level of disagreement (2 points). Students considered that the day-to-day problems of the teaching profession are a minimal part of what teaching entails, so they appreciate that basic theoretical aspects and a broader view of the profession are also addressed in the PGCE.

Table 5 summarizes the comments to the questions on the RE principle.

Table 5

Results of the interviews for the items corresponding to the RE principle

Questionnaire items	Valuation	Comments to the items
4. The activities I find most useful for learning are exercises where I can apply my knowledge and/or experience.	A1 - 4	"It relates to meaningful learning, what you already know you relate to the theory."
	A2 - 4	"The exercises with which I learn the most are the practical ones. I don't seem to learn anything from the theoretical ones, I need to know what they are for."
	A3 - 4	"This is meaningful learning, when you apply what you have learnt. Especially in my dissertation, I am a social worker and I based it on a community project."
	A4 - 4	"They bring you closer to reality than just theory in text."
	A5 - 2	"My way of learning..., I learn by heart, even if it is more useful, in my case it doesn't apply, I prefer concepts."
5. It helps me to understand the syllabus when the teacher gives real-life examples that I can relate to my personal experience.	A1 - 4	"We always remember the anecdote or the story, it is easier to remember something real than pure theory."
	A2 - 4	"So the teacher brings the theory closer to real life ... to your reality, you visualize it, it helps you to put yourself in the situation, it's more effective."
	A3 - 4	"When you relate any content to an example, it is much easier to visualize and understand."
	A4 - 4	"Anything that has to do with relating content to reality is a shortcut to internalizing learning and learning skills."
	A5 - 4	"The more conceptually abstract subjects... giving real examples helps me to understand concepts and how they relate to reality."

6. I appreciate activities that make me reflect on my previous knowledge and experiences.	A1 - 3	“Yes, it makes you dig into what you already know and matches what you are learning.”
	A2 - 3	“I like activities that awaken the desire to learn more, that make me realize that I need to learn more.”
	A3 - 4	“They encourage debate, criticism, sharing ideas with colleagues and teachers.”
	A4 - 3	“It can help you learn to compare the point of view I had as a student and later as a teacher.”
	A5 - 4	“Studying teaching makes you look at your own learning experience as a student and analyze it from the point of view of a teacher. You think about things I would change about my teachers or, on the contrary, things that were done well.”

Note: Composed by the authors.

Regarding item 4 (activities applying knowledge and/or experience), the terms “meaningful learning” (A1, A3) and “close to reality” (A4), “knowing what it is for” stand out. Only the younger students prefer more conceptual content, which facilitates memorization, to practical exercises.

As for the answers to item 5 (real-life examples), all five students agree that it is an important factor for their learning that the teacher gives examples of the concepts related to reality. The following terms stand out: “memorizing” (A1), “internalizing” (A4), “visualizing” (A2 and A3) and “understanding” (A3, A5).

Item 6 (reflecting on previous knowledge and experience) did not receive the same unanimity, although the responses are between 3 and 4. It is noteworthy that “realizing that you need to know more” is a motivating factor for A2. Also, that A4 and A5, having no teaching experience, compare the content of the PGCE with their experience as students and assess the teachers they had in the light of the new knowledge. Student A3 points out that this type of activity encourages debate, criticism, and the sharing of ideas with peers.

DISCUSSION AND CONCLUSIONS

The present study aimed to analyze how learning preferences and strategies are distributed among different profiles of online learners in terms of age and gender, employment status, and previous experience through self-identification with two of the andragogical principles proposed by Knowles (1980): NK and RE. The specific objectives were: 1) To test the theoretical validity of these two principles of Knowles' theory through 21st-century online learners' evaluations of the different didactic strategies that relate to these principles; 2) To identify whether there are significant differences in terms of different age groups' valuation of these strategies, and the relationship with their experience and employment status (whether they are currently employed or not); and 3) To explore gender differences in these preferences.

Regarding the first objective, a review of the literature on the adult and online learner has made it possible to operationalize Knowles' principles in items related to teaching and learning strategies. The results contribute to reaffirming the usefulness of andragogy in understanding how adult online university students learn. The basic

principles of adult learning do not seem to be affected by the non-face-to-face nature of the online classroom, only the form of the technology-mediated teaching-learning process (Johnson, 2014). Students in this study value information that gives them an idea of how much effort and time they have to put in (Sun & Chen, 2016), what is expected of them, and what to expect from the teacher (Bailey & Card, 2009), how the subject is structured (Trammell & LaForge, 2017), how it makes sense and why it is important (Knowles et al., 2020) for the profession. Regarding the RE in learning and the orientation of learning to solve real-life practical problems, it can be concluded from the interviews that students value activities of this type with a score between 3 and 4, in contrast to the study by Kennan et al. (2018) who did not find students' need to connect their learning to the real world, the job, or experience. However, the students in this study also expect the training they receive to go beyond technical training to solve everyday problems in the teaching profession. In general, it can be said that students use strategies related to Knowles' principles. These results confirm those found by Aljohani and Alajlan (2021) and by Rodrigo et al. (2024), as well as the studies analysed by Puwari et al. (2022).

Regarding the second specific objective, no significant differences were found between the three age groups, although the 26-45 age group is the most heterogeneous since among the students in this group there are closer responses to 2 compared to the students in the other two groups, although this may be due to the fact that it is also the largest age group and therefore the most heterogeneous in terms of previous online experience, which seems to be an important factor in choosing this type of training (Henrikson & Baliram, 2023) and in organizing their time (A1 and A2). These results seem to confirm that culture, learning environment, and life experiences may be more significant determinants of how people learn than age (Knowles, 1980).

In terms of gender distribution, no significant differences were found in any of the principles, although in the group of women, a lower variability of responses was found, all close to 4 in both principles. Therefore, concerning the criticism of the male bias of andragogical theory (Moll, 2023), in the sample analysed, the assumptions of andragogy would be equally or more valid than for the male gender, particularly about the need to know. This result is in line with Aljohani and Alajlan (2021) and could be interpreted as a greater need to organize their time efficiently due to family responsibilities. In Roessger et al. (2020) preferences for andragogical principles were higher for men with education above secondary school and from highly qualified professions. In Kennan et al. (2018) no differences were found according to socio-economic status. The private university context in this study and the access requirement of university qualification together with a female majority makes the sample more homogeneous in this respect. Therefore, concerning the critique of class bias, gender, and cultural differences (Moll, 2023; St. Clair & Käpplinger, 2021) in their approaches we are inclined to think, in the light of the results, that class and the level of qualification of the student body may have more influence than gender on the preferences about the pedagogical model of the study programme.

As for the RE principle, a significant effect was found according to experience in the education sector. Surprisingly, inexperienced learners place a higher value on activities that use prior experience as a learning resource, as opposed to more experienced learners, which seems to contradict the principle of andragogy and the

claim that adult learners actively seek to apply their experiences in a practical context (Kleinke & Lin, 2020). However, this could be interpreted as the former's need for a higher degree of guidance from the teacher (van Riesen et al., 2018) to make practical sense of the content as they lack references from actual practice. The quantitative analysis indicates a greater dispersion of responses to this principle in the group <25 years old, which logically coincides with less or no work experience, and which uses their experience as a student as a resource or strategy (A4 and A5).

The LMS often reduces the teacher's freedom in the curricular design of the courses they teach (Baldwin et al., 2018), however, the improvements in student-content and student-teacher interaction proposed in this study through the questionnaire items and interviews conducted can improve satisfaction, online student academic outcomes and reduce dropout (Ke & Kwak, 2013; Kuo et al., 2014) and are within the scope of the online teacher.

One of the limitations of this study is the absence of an analysis of the variable of the degree with which students access the PGCE, which could yield alternative distributions in terms of the strategies used by students. Another limitation is the size of the sample, which does not allow us to generalize the findings to the entire population of students who choose an online education in Spain.

However, the constructed instrument has been confirmed as valid and reliable in the approach to digital andragogy, to develop a valid theoretical framework for the training of today's adults in virtual environments.

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