

Validating an Instrument of Adult Learning Needs in Online and Blended Learning

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<https://doi.org/10.34190/ejel.24.4.4684>

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Abstract: It is a challenge to promptly respond to the learning needs of students, particularly adult learners characterized by rich lived-experiences, (sometimes) negative prior learning experience, multiple and contrasting motivation types alongside considerable socio-demographic heterogeneity. Furthermore, developing a typology of adults' learning needs remains a challenging endeavour given the different perspectives in learning needs conceptualization and the different theories concerning adult learning in both traditional and online and blended learning (OBL). In particular, no validated instrument currently exists to identify and measure adult learners' needs in OBL contexts, representing a gap that needed to be addressed. This paper developed and validated an instrument to identify adults' learning needs based on adult learning, self-regulated and motivational theories, and technological acceptance models. We deconstructed adults' learning needs into three categories based on the existence, relatedness, and growth (ERG) theory of human needs. Data (N=209) were collected from adult learners following blended learning programs in eight centres of adult education in Flanders, Belgium. Confirmatory factor analysis (CFA) revealed that the instrument comprising of nine dimensions of learning needs displayed adequate model fit and factor loadings. Multivariate analysis of covariance (MANCOVA) highlighted that learners who differed in educational attainment, age, and ICT skills reported differences in their needs across the sub-dimensions. Motivational orientations, however, did not significantly differentiate learning needs at the multivariate level. The validated instrument, hence, offered practitioners a diagnostic tool for needs-based OBL design. Theoretically, the study challenged the assumption that motivational orientation alone predicted differentiated need profiles in OBL, opening new avenues for debate on the interplay between motivation, prior experience, and adult learning needs.

Keywords: Adult learners, Learning needs, Socio-cognitive theories, Technology acceptance model, Motivational orientations

1. Introduction

Adult learners bring to the classroom a broad range of lived and prior learning experiences (Ross-Gordon, 2003), alongside diverse motivation profiles and population-specific constraints such as time pressures and self-esteem concerns (Cercone, 2008). Adult learning needs, conceptualized not as generic skill deficiencies, but as an integrated set of psychological, situational, and instructional requirements that are foundational to sustaining adult motivation and performance in technology-mediated spaces (Diep et al., 2019), do substantially

differ. Understanding how to capitalize on adult learners' strengths, i.e., rich lived experiences, and reduce the constraints is of crucial importance to help adults better achieve in their registered program.

From a socio-constructivist perspective, online and blended learning (OBL) combining online and face-to-face instruction (Graham, 2006) postulated that through online interaction, adults exchange ideas and reflect on existing knowledge, resulting in reinforced or transformed frames of reference (Mezirow, 2000). In what ways can instructors and practitioners take into account both adult learners' characteristics and the requirements of learning in a blended learning environment to support them during the learning process? The research field has presented both theoretical and empirical works on adult learners' profiles, adult learners' motivation and self-regulated learning (Mertens, Maeyer, and Donche, 2024), the challenges of learning in a blended learning environment for adults, and also how learning activities can be best designed to optimize learning. To address those characteristics specific to adult learners, prior research has leaned on separate tools, such as scales evaluating digital skill literacy (van Deursen, Helsper, and Eynon, 2014), academic self-directedness (Botha and Masenge, 2022), or generalized e-learning readiness instruments (Loock et al., 2022). However, these existing measurement tools often evaluate psychological, technical, or environmental traits in isolation, and many remain grounded in traditional face-to-face andragogical models rather than modern digital dynamics. Few instruments are explicitly tailored to capture the overlapping systemic and psychological constraints inherent to adults navigating OBL spaces. Consequently, an instrument to identify adults' learning needs remains scarce, particularly in an OBL environment.

A closer examination of existing instruments revealed specific methodological shortcomings that further justified the present study. The Distance Education Learning Environments Survey (DELES; Walker and Fraser, 2005), while widely used, was developed for higher education distance learners, and did not account for the face-to-face component inherent in blended learning, nor did it address the motivational heterogeneity characteristic of adult populations. Similarly, the e-learning readiness scales reviewed by Loock et al. (2022) primarily assessed learners' preparedness to engage with digital platforms rather than the full spectrum of psychological and instructional needs that sustained adult motivation during the learning process. The digital skills framework proposed by van Deursen, Helsper, and Eynon (2014) captured one important dimension of adult learners' needs but ignored relational and structural needs that were equally critical in OBL. Notably, the accelerated transition to OBL learning during and after the COVID-19 pandemic has further exposed these gaps. For instance, studies conducted in post-pandemic adult education contexts highlighted that digital exclusion, social isolation, and the lack of face-to-face support structures have intensified adults' needs in ways that pre-pandemic, single-domain instruments were not adequate to capture (Chambers and Whitfield, 2025; Mertens, Maeyer, and Donche, 2024). Together, these limitations underscored the need for an integrated, OBL-specific instrument that simultaneously addressed the existence, relational, and growth dimensions of adult learning needs.

To address this gap, the present study develops an ERG-based framework (Alderfer, 1969) and operationalizes it into a validated instrument measuring adult learning needs across existence, relatedness, and growth dimensions. We further examine need differences by motivational profiles and socio-demographics.

2. Theoretical Framework of Adult Learners' Needs in OBL

2.1 Conceptualization of Adult Learners' Needs

Although the conceptualization of adults' learning needs has been widely discussed in the literature, a large body of research has shown that this notion could be described from multiple approaches. The functional approach, which was based on scientific empiricism, highlighted that educational needs can be identified objectively (Sava, 2012; Pearce, 1995). Along these same lines, the needs of learners were focused on what people need to know in order to do something better than they were currently doing (Pearce, 1995). The empowerment approach, which has relied on the subjectivist perspective, considered classifying learners' needs as a process in which instructors play a central role (Sava, 2012; Pearce, 1995). Within this paradigm, Pearce (1995) postulated that course designers tended to follow the functionalist approach when it came to formal needs assessments and suggested that adult learners were key actors in identifying needs rather than instructors. Sava (2012) primarily applied the empowerment perspective in informal needs analyses.

Combining the two paradigms mentioned above, Laurillard (2012) proposed a new conceptual viewpoint in which instructors played a vital role in identifying educational needs. To that end, educators needed to clarify learners' prior experiences, their strengths and weaknesses in order to help them transcend their preferred learning styles. In the current study, we adopted the conceptualization of learning needs from Diep et al. (2019),

defining adults' learning needs as "those that motivate learners and substantially enhance their learning, the lack of which will lead to demotivation and failure to achieve major learning and personal goals" (p.227-228).

2.2 The Construction of a Conceptual Framework and the Classification of Adult Learners' Needs in OBL

2.2.1 Literature review

A body of research demonstrated that there was no universal framework for adapting learners' needs in OBL. Instead, there were several theoretical models which equally supported designing OBL addressed to learners' needs. In the current study, several relevant theories have been selected and critically examined in terms of their relevance and limitations for understanding adult learners' needs in OBL.

The Community of Inquiry theory (Col) (Garrison, Anderson, and Archer, 2000) was the first framework devised for guiding construction and facilitation in an online learning environment. Rooted in the socio-constructivist theory, the theoretical model emphasizes the construction of knowledge as a collaborative process. Accordingly, it required the active participation of learners, well-structured design and effective facilitation strategies developed by the instructors. However, the Col model has been noted to inadequately explore how individual motivational factors influence learning, an aspect of particular relevance when working with adult populations (Yang and Lay, 2024). Furthermore, the rapid expansion of blended and/or fully online delivery in adult education following the COVID-19 pandemic has revealed new challenges that the original Col framework did not anticipate, namely heightened digital inequalities among adult learners, the erosion of informal peer support that typically occurs in face-to-face settings, and increased demands for instructor presence in asynchronous environments (Chambers and Whitfield, 2025). These developments call for updated theoretical lenses that account for the structural and motivational vulnerabilities specific to adults in contemporary blended contexts.

While the Col focuses on guiding the design and facilitation of online learning activities, the self-determination theory (SDT) (Ryan and Deci, 2000) closely examined human motivation and personality. This theory highlighted three essential components of human needs: competence, autonomy, and relatedness. The first element, competence, was closely related to self-efficacy and indicated a person's belief and confidence in whether he/she could successfully accomplish a set task independently. Autonomy, the second component, refers to self-directed action that will result in real changes. Niemiec and Ryan (2009) posited that autonomy must go hand in hand with competence as both elements were equally essential for maintaining intrinsic motivation. The third feature, relatedness, was rooted in the viewpoint that human needs were closely related to innate tendencies toward connectedness, effectiveness, and coherence (Ryan and Deci, 2000). Based on the SDT, various empirical studies have been conducted to gain insight into learners' needs in adult learning environments. For example, Reeve (2002) found that autonomy plays an essential role in learners' motivation. Furthermore, the study of Knowles, Holton, and Swanson (2005) provided empirical evidence that adult learners are internally motivated and self-directed.

While SDT addresses motivational needs, it does not account for the technological conditions that mediate learning in OBL. Technology affordance theory thus offers a complementary lens. The theory of affordance was initially proposed by Gibson (1979), who indicated the characteristics of an environment, the agents and the connection between them. When it came to virtual learning settings, the social values of mobile learning devices and online learning processes could be implied by the concept of technology affordance. Not surprisingly, a substantial body of research aiming to connect technology to the affordance theory (Oliver, 2013). For example, Gaver (1991) posited that the study of affordance should "focus not on technologies or users alone, but the fundamental interactions between the two" (p. 5).

While the theories discussed above illuminate distinct aspects of OBL design, none offers a sufficiently integrated account of adult learners' needs. The ERG theory, discussed in the following section, addresses this limitation. Furthermore, this theoretical fragmentation is mirrored in the limitations of existing measurement instruments. Col-based scales (e.g., Arbaugh et al., 2008) focused primarily on cognitive and teaching presence, overlooking the existence-level needs (technical access, transparency) that were particularly salient for adult learners with limited digital experience. SDT-based instruments (e.g., Walker and Fraser, 2005) captured motivational and relational dimensions well but did not integrate the technological acceptance conditions that shaped whether adults could activate or exercise their autonomy in OBL environments. Technology acceptance models such as TAM (Davis, 1989) addressed system usability but neglected the relational and growth needs that deemed critical to adults' cognitive engagement beyond platform adoption. Taken together, these frameworks addressed adult learning needs in silos rather than as an integrated system — a limitation that becomes particularly pronounced in blended learning contexts where existence, relational, and growth demands co-occur

and interact simultaneously. A theoretical model that considers the different demands of learners was put forward by Milheim (2012) to create an extensible framework for OBL learning design based on current ideas. This "hierarchy of learner's needs" paradigm, which had its roots in Maslow's theory, is composed of five levels: self-actualization, relationships, safety, self-esteem, and physiology. Nonetheless, the model focused more on material preparation than on explaining why content matters in terms of fulfilling learners' needs. Additionally, communication technologies were brought up frequently in a variety of categories, making it challenging to explain their role in addressing learners' needs within the instructional framework. Furthermore, according to Abela (2009), Maslow's needs typology might be overly strict, causing categories to overlap. For instance, Milheim (2012) notes that pre-course preparation was a safety requirement and that delivering a checklist of necessary items should be received as a physiological need. These two fell within both categories.

2.2.2 Adult learners' needs viewed from the perspective of the ERG theory

Alderfer (1972) created a new model based on the findings of empirical research and an expansion of Maslow's hierarchy of needs to address the shortcomings previously mentioned. Accordingly, the three primary components of human needs have been categorized as existence, relatedness, and growth. Existence needs concerned various safety-related, physiological, and material needs; relatedness needs involved a sense of security, belonging and respect; and growth needs included self-esteem and self-actualization.

Compared to Maslow's rigid hierarchy, the ERG theory offers greater flexibility by allowing simultaneous activation of multiple need levels, which better reflects the non-linear nature of adult learning trajectories in OBL (Alderfer, 1972). Furthermore, the model might offer a helpful technologically assisted learning environment to enhance the process of knowledge development. In terms of student motivation, the ERG theory can effectively illustrate different forms of motivation. One way to understand the growth needs in the ERG model is to consider the motivation of learners to advance their knowledge and skills for personal or professional purposes. On this basis, Diep et al. (2019) proposed a conceptual framework for designing OBL to address adult learning needs, which is summarized below.

Existence needs

The first dimension, existence, emphasized the role of the technical and structural conditions that supported adult learners in achieving their learning goals as well as organizing their learning process. Thus, three sub-dimensions emerged under existence needs: system functionalities, technical support, and transparency. As for system functionalities, usefulness and ease of use of the LMS were highlighted as consistent predictors of learning retention (Davis, 1989; Venkatesh, Thong and Xu., 2012). Concerning technical support, several studies posited that learners achieved the most and felt more engaged in virtual learning courses when they received adequate technical support (Addae, Abakah, and Amuzu, 2025). Put differently, providing technical support was vital to enhancing learners' confidence in using the online system so that they could be more active and interactive in their learning (Prior et al., 2016). On the contrary, a lack of support on technical issues may lead to a negative attitude toward the use of the LMS in their learning. Thus, it was essential that learners did not encounter technical issues in the first place. The last component under existence, transparency, highlighted the importance of the transparent clarification of learning goals and outcome expectations when it came to the nature and functioning of the course (Poll, Widen and Weller, 2014; Dixon, 2014). In addition, Locke and Latham (2002) proposed that clear expectations of assessment were useful in order to provide learners with a global picture of what they must do, how they could self-evaluate their learning progress, as well as how to make more effort when necessary to address the discrepancies in their knowledge acquisition.

Relatedness needs

The motivation for fostering new social relationships and relief from daily routines (Boshier, 1991) was aligned with the dimension of relatedness. The ERG theory, viewed from a social inclusion perspective, displayed the potential to demonstrate how engaging in educational programs could nurture the two vital features of social inclusion, namely connections and self-activation (De Greef, Segers, and Verté, 2012). By blending the literature on knowledge construction and socio-constructivism with this dimension of learner motivational orientations, three main components, namely online interaction, instructor facilitation, and sense of belonging, were presumed to vary as a function of relatedness—the second category of adult learners' needs. Concerning online interaction, Laurillard (2012) highlighted that peer interaction played a vital role in the construction and cultivation of knowledge. Accordingly, collaborative and interactive activities with peers enabled learners to utilize and activate their prior knowledge. In addition, participating in a collaborative community provided them with useful feedback to further improve their learning performance through a reflective process. Furthermore,

to ensure the effectiveness of peer collaboration in virtual learning communities, the instructors' role has been emphasized in a large body of literature (Hsieh and Tsai, 2012; Chambers and Whitfield, 2025). The responsibilities of online facilitators generally involved moderating the discussion and keeping it on track, responding to learners' questions and concerns in a timely and effective manner, and motivating them to express their views and engage in the course (Peltier, John and William, 2007). Drago and Peltier (2004) posited that instructor-to-student interactions were critical for enhancing learner connectedness to the online learning community. Thus, the instructor's online facilitation served as a second sub-category under relatedness. Furthermore, beyond the need to interact with peers, sense of belonging was another essential feature of the blended learning environment as it contributed to encouraging learners to interact with their peers (Koul, Fisher, and Shaw, 2011). In this respect, a number of studies have found that sense of belonging played a crucial role in motivating learners to persevere and complete the course when under pressure (Mebane et al., 2008).

Growth needs

Drawing from constructivism, autonomy, relevance, and competence, as well as andragogical assumptions (Knowles, 1984), self-determination theory (Ryan and Deci, 2000), and self-directed learning, we suggested three components that fall under this classification, namely autonomy, relevance, and competence. Autonomy, which was rooted in the self-determination theory, refers to affordable/accessible opportunities for learners to seek knowledge, to achieve, to be independent and to feel competent in learning (Bangert, 2004; Ross-Gordon, 2003; Walker and Fraser, 2005). Along these same lines, Bangert (2004) and Knowles (1984) highlighted the importance of considering a range of diverse talents, learning strategies, and prior learning in order to nurture learning autonomy. Relevance, which was based on constructivism and andragogy, emphasized authentic activities that were highly relevant to real-world experience (Reeves, Herrington, and Oliver, 2002). In addition, Woo and Reeves (2007) recommended meaningful online interaction in which learners have opportunities to engage, negotiate, and collaborate, etc. with their peers to resolve authentic tasks. Competence needs refer to "the experience of behaviour as effectively enacted" (Niemic and Ryan, 2009, p. 135). In order to enhance competence, feedback and learning activities of a formative nature were necessary. While access to feedback enables learners to enhance their learning, experience, self-efficacy (Bandura, 1986) and/or achieve the learning goals at hand (Niemic and Ryan, 2009), learning activities accompanied by cognitive challenges assist them in testing and transcending their academic capacities.

2.3 Adult Learners' Motivational Orientations and Learning Needs

Adult learners generally brought different types of motivation when registering for a course or a program. These motivation types could be summarized as extrinsic or intrinsic motivation (Deci and Ryan, 2000). The extrinsic dimension referred to the reward that could be obtained as a result of the invested effort whereas intrinsic motivation pertained to the internal pleasure and fulfilment achieved through the learning per se. Obtaining a diploma and the pursuit of new knowledge and skills were specific examples of extrinsic and intrinsic motivation, respectively. Intrinsically motivated learners were more likely to employ a deep learning approach to learning, which included seeking peer and instructors' support and proactively managing time (Pintrich and Zusho, 2007). On the other hand, extrinsic learners tended to apply a surface learning approach such as memorization and exerted minimal effort on required learning tasks (Pintrich and Zusho, 2007). Therefore, it was argued that learners with different types of motivation will have different learning needs - a distinction that existing instruments have rarely operationalized, representing a gap that the present study addresses. As a consequence, it is hypothesized that adult learners of different motivational orientations, namely diploma-oriented and knowledge-and-skills oriented, will differ in their learning needs.

Next to motivation, adult learners' socio-demographics including gender, age, employment status, ICT skills, and educational levels proved to be influential factors in learning in a blended environment. Older adults might have lower computer self-efficacy and thus presented more needs for technical support. Additionally, Ke and Kwak (2013) discovered that older learners favoured online interactions more than younger learners. Adult learners who were more advanced in computer skills may not experience technical problems, and hence probably required less support from the instructors. Furthermore, adult learners who were heavily occupied with other obligations might opt for an individual approach to learning. Consequently, online interaction or collaborative learning was less favoured. For example, female learners were found to be more engaged in social interactions and working learners were more active in facilitating discussion (Diep et al., 2017). As for educational levels, learners who had a higher degree or were more capable than their peers seemed to attribute less value to collaborative work, mentioning that they needed more time for peer correction (Kollock, 1999). In other words,

we recommended that socio-demographic variables including gender, age, employment status, ICT skills, and educational levels should be investigated to yield more understanding of adults' learning needs.

2.4 Research Questions

In order to examine adults' learning needs in OBL, this research focused on the following research questions.

RQ1. To what extent could the nine dimensions of adults' learning needs in an OBL environment be distinguished?

RQ2. Did adult learners with different motivational orientations differ in their learning needs, controlling for age groups, gender, ICT skills, and educational levels?

The first main objective was to establish the structural validity and distinctiveness of the nine learning needs dimensions (**RQ1**). This serves as a psychometric prerequisite for the subsequent analysis. Based on the validation of the dimensions, specific adults' learning needs were analyzed related to adult learners' background variables and their motivational orientations (**RQ2**).

3. Methodology

3.1 Research Design and Participants

The study adopted a cross-sectional design, in which adult learners following a blended learning program across different adult education centers (Centrum voor Volwassenenonderwijs – CVO) in Flanders, Belgium were invited to participate in the questionnaire. The learners completed the questionnaire online in most cases. When possible, the researcher distributed the questionnaire in the classroom at the beginning of the class. At the time of completing the questionnaire, the adult learners had completed at least one semester of a one-year program or were in their final semester. In total, 209 participants completed the questionnaire, drawn from 14 campuses of 8 CVOs. As for the programs they were following, participants were enrolled in one of the 13 programs as shown in Table 1. As the number of learners following each program was not equal and there were programs with few learners, all 13 programs were collapsed into 4 categories based on their course objectives. Accordingly, four categories of programs were created, i.e., category 1 comprised pedagogical programs, category 2 administrative, category 3 caring, and category 4 technical.

Table 1: Participants' current training programs

Program	Number	Percentage	Category
Specific Teacher Training	108	51.7	(1) Pedagogical
Freelance coaching	19	9.1	
Subtotal	127	60.8	
Librarian	5	2.4	(2) Administrative
Administrative commercial assistant	4	1.9	
Medical administrative assistant	3	1.4	
Real Estate	9	4.3	
Dispatcher	7	3.3	
Subtotal	28	13.4	
Beauty	18	8.6	(3) Caring
Childcare	24	11.5	
Subtotal	42	20.1	
Computer and networks techniques	2	1	(4) Technical
Graphical designer	1	0.5	
Computer-Aided-Design draftsman in construction	7	3.3	
Webmaster and Social media manager	2	1	
Subtotal	12	5.7	
Total	209	100	

Table 2 provided information regarding the learners' socio-demographics. As can be seen, the number of female participants was twice as that of male learners. Young learners (≤ 25 years of age) constituted the largest group, followed by those aged between 26-34 (28.7%), and 35-44 (23.4%). Most of the learners were employed, with full-time working learners being the majority. Roughly half of them were married or cohabiting with a partner and the other half was single. As for education levels, more than half of the learners had obtained a tertiary education, i.e., holding a bachelor's or post-graduate degree. Two-thirds of the participants had no prior experience with blended learning.

Table 2: Adult learners' socio-demographics (N=209)

Categories	Number	Percentage
Gender		
Male	65	31.10
Female	144	68.90
Age group (M=33.09; SD=10.83)		
≤ 25	65	31.1
26-34	60	28.7
35-44	49	23.4
≥ 45	35	16.7
Marital status		
Married or living together	106	50.7
Single	96	45.9
Employment status		
Full-time employed	93	44.5
Part-time employed	27	12.9
Fully-registered students	89	42.6
Education levels		
Lower secondary	20	9.6
Higher secondary	72	34.4
Bachelor	66	31.6
Post-graduate	51	24.4
ICT skills		
Beginner	9	4.3
Immediate	109	52.2
Advanced	91	43.5
Blended learning experience		
Yes	80	38.3
No	126	60.3

3.2 Instrument

The instrument adopted existing scales that have been validated in previous research. In this study, we brought them together in one instrument to reflect three layers of adults' learning needs. The questionnaire consisted of two main sections as follows.

Section 1

The general information included the socio-demographics, the information regarding learners' current blended learning program and their (expected) grades, their experience with ICT skills and blended learning, and finally, their motivational orientations when following the program.

As for the motivational orientations, the participants were asked to indicate a Yes or No response regarding their motivation when enrolling in the program, including the following:

1. I'd like to get the diploma.
2. I'd like to improve my knowledge and skills for my current and/or future job
3. I'd like to make new friends and meet new people
4. I'd like to get more fun and relief from my daily routine and boredom.
5. I'd like to learn new knowledge and skills.
6. I participate because this course will prepare me for service to the community.
7. I participate because I need to comply with my employer's policy or to secure social benefits.

Descriptive statistics revealed that there were only two learners indicated their motivation as type (3), namely looking for new friends and relationships, as shown in Figure 1. Additionally, the motivational orientations related to daily routine relief (4), service to community (6) and securing social benefits (7) received little recognition from the learners. As a consequence, it was decided that only motivation 1, namely diploma-oriented, and motivation 2, knowledge-and-skills oriented, were included subsequently in discerning the differences in learners' needs as indicated by the adult learners. Once a learner indicated both motivation 1 and motivation 2, a third category was created. In other words, after recoding, the motivation orientation variable now consists of three categories: diploma-oriented (n=87), knowledge-and-skills oriented (n=60), and both diploma and knowledge oriented (n=24).

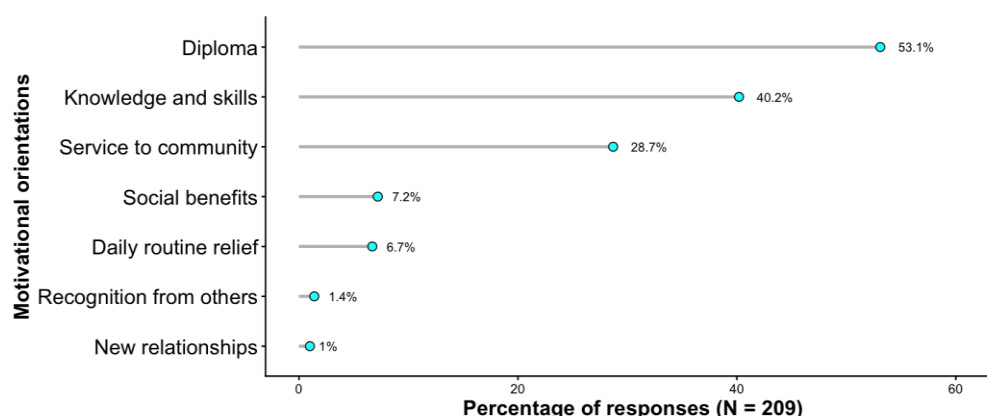


Figure 1: Proportion of responses for each of the motivational orientations of course participation

Section 2

The second section of the questionnaire comprised the main variables examined in the study. Accordingly, corresponding to each dimension of learning needs, four items were developed to capture the scale. In total, 36 items captured the 9 dimensions of learning needs. The items were phrased such that the learners indicated the extent to which they agreed with the statements describing the learning needs. The scale ranged from (1) strongly disagree to (5) strongly agree. All the scales were translated from English into Dutch using back-translation.

The adaptation process followed a systematic multi-step procedure. First, the original English items were translated into Dutch by a bilingual researcher with expertise in adult education, after which an independent bilingual translator back-translated the Dutch version into English. Discrepancies between the original and back-translated versions were discussed and resolved by consensus among the research team. Beyond linguistic equivalence, the wording of selected items was reviewed for contextual fit within the Flemish adult education (CVO) setting. For instance, references to "the learning platform" were standardized to reflect the specific LMS infrastructure used across the participating CVOs, and items relating to instructor roles were aligned with the facilitation practices typical of blended CVO programmes. These adaptations were minor and did not alter the theoretical meaning of the original constructs. The adapted Dutch questionnaire was subsequently reviewed by two experienced CVO instructors for face validity prior to distribution.

An overview of the variables is presented in Table 3. The Dutch version of the questionnaire is presented in Appendix A and English-version (not validated, for reference purpose) Appendix B.

Table 3: Overview of the adopted scales

Learners' needs	Authors	No. of items	Sample items
Existence			
Transparency	Ginns and Ellis (2009)	4	It is necessary that ... The instructor makes it clear right from the start what they expected from students.
System functionalities	Diep et al. (2016)	4	I can find the information on the learning platform easily.
Technical support	Lee et al. (2011)	4	I feel that I can get technical support when I need it.
Relatedness			
Facilitation (instructor)	Arbaugh et al. (2008)	4	The instructor encourages course participants to explore new concepts in this course.
Peer interaction	Walker and Fraser (2005); Laurillard (2012)	4	I can work collaboratively with peers in a project/task.
Sense of belonging	Rovai (2002)	4	I feel that I can rely on others in this course.
Growth			
Personal relevance	Walker and Fraser (2005)	4	I can apply my everyday experiences in class.
Competence support	Ausburn, (2004); Laurillard (2012)	4	The instructor offers learners timely guidance
Autonomy support	Walker and Fraser (2005)	4	I am in control of my learning.

3.3 Data Analysis Methods

First, confirmatory factor analysis (CFA) was conducted to examine the nine components of adult learners' needs. CFA was preferred over exploratory factor analysis (EFA) given that the factor structure was theoretically specified a priori based on the ERG framework, thus allowing for confirmatory rather than exploratory testing of the proposed dimensions. Regarding sample size adequacy for CFA, the present study's sample of N=209 satisfied commonly recommended thresholds. Following the widely cited 5:1 to 10:1 participant-to-parameter ratio (Hair et al., 2010), the model's 36 observed variables and nine latent factors require a minimum of approximately 180 observations, which the current sample exceeded. Additionally, simulation studies suggested that CFA models with strong factor loadings (above 0.50) and adequate communalities can achieve acceptable parameter recovery with samples as small as 150–200 (Wolf et al., 2013). The adequacy of the present sample was further supported empirically by the stable factor loadings (all above 0.50) and acceptable fit indices obtained in both the continuous (ML) and ordinal (WLSMV) estimation approaches, indicating that the sample was sufficient to reliably estimate the proposed factor structure. As the scale responses ranged from (1) strongly disagree to (5) strongly agree, there has not been a consensus whether to treat them as continuous or ordinal. The treatment of the scale might have consequences on estimation procedures. In this case, when treating the scale as ordinal, Byrne (1998) suggested Weighted Least Squares (WLS) estimation as the procedure, whereas with continuous scaling, Maximum Likelihood was suggested. Model fit was evaluated by goodness-of-fit indices including the Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Squared Residual (SRMR). Factor loadings above the threshold of 0.500 were deemed satisfactory. McDonald's Omega (ω) was employed to examine composite reliability of the resulting scales, with values above 0.7 being considered reliable.

Subsequently, a factor score was calculated for each dimension before further analyses were conducted. Descriptive statistics and measures of skewness and kurtosis were calculated to check the variability of the dependent variables, namely the nine learning need dimensions. Afterwards, multivariate analysis of covariance (MANCOVA) was conducted to answer RQ2. MANCOVA was chosen over separate univariate tests as it simultaneously examined group differences across all nine learning need dimensions while controlling for socio-demographic covariates, thereby reducing the risk of Type I errors. This was preceded by assumption verification by the Box's M and Levene's test of homogeneity of covariance matrices and variances, respectively. For both

tests, a non-significant p-value suggested the acceptance of the null hypothesis. For the multivariate tests, Pillai's Trace and Wilks' Lambda were chosen as tests of significance because they were considered as more robust. Once a dependent variable or a dimension of learning need was significant at the multivariate level, univariate tests were performed to examine the nuanced differences in the perceptions of learning needs among learners of different profiles.

All analyses were performed using R software (R Core Team, 2023).

4. Findings

RQ1. The dimensions of the learning needs

Validation of learning needs instrument

As the scales were developed based on a predefined theoretical framework, we specified a priori model with nine separate scales making up the three layers of learning needs. Accordingly, the Existence layer consisted of three factors: transparency, the quality of the learning platform (LMS quality), and technical support. The Growth layer was made up of three factors, namely the relevance (of the learning content), competence support, and the autonomy. Finally, the Relatedness layer comprised three factors, i.e., instructor's facilitation, peer collaboration, and sense of belonging.

When treating the variables as continuous and using Maximum Likelihood as the estimation procedure, the model revealed adequate fit with $\chi^2(558)=981.276$, $p<.001$. The CFI had a value close to 0.9 ($=0.885$); RMSEA was slightly above 0.05 ($=0.062$); and SRMR was smaller than 0.08 ($=0.067$). All factor loadings were well above the cut-off value of 0.500. Before deciding whether the model should be further improved based on the modification indices, the model was verified by treating the observed variables as ordinal. Accordingly, Robust Weighted Least Squares (WLSMV) was used as the estimation method. The result was similar to the first approach, with fit indices displaying better model fit: $\chi^2(558)=686.759$, $p<.000/.001$; CFI = 0.985, RMSEA=0.034; SRMR=0.074. All factor loadings once again revealed adequate loadings ($>.500$). Therefore, no further adaptation with respect to freeing error covariances was adopted in order to keep the parsimony of the final model. Regarding composite reliability, ω revealed good reliability for all nine dimensions, ranging from 0.76 to 0.93. The results are presented in Table A1 in Appendix C.

Further, we tested a second-order factor structure, i.e., whether the three latent variables confirmed in the previous step could be explained by a higher-order factor. In other words, we examined if transparency, LMS quality, and technical support could be subsumed under the higher order factor of existence; relevance of learning content, competence support, and autonomy under growth; and instructor's facilitation, peer collaboration, and sense of belonging under relatedness. The model fit indices were $\chi^2(24)=124.916$, $p<.001$; CFI = 0.857 ($<.09$), RMSEA=0.146 ($>.05$); SRMR=0.090 ($>.08$). This showed a lack of fit as all the indices did not satisfy the cut-off value. The factor loadings indicated that all first-order variables loaded adequately to their respective higher order factor, except autonomy (0.322). Table A2 the Appendix C presents the factor loadings resulting from the analysis.

Thus, in response to RQ1, the nine dimensions of adults' learning needs could be distinguished from one another. Accordingly, most first order variables could be explained by their respective higher order factor, except autonomy. A close examination of model fit indices suggested that a structural model with higher-order factor displayed poorer fit than the model with only first-order factors. Thus, the latter, which was more parsimonious was selected, i.e., treating the nine dimensions of learning needs as separate from one another.

RQ2. Adult learning needs as a function of motivation orientations, controlling for the effect of program type, age groups, gender, education levels, and ICT skills?

Descriptive statistics of the dependent variables

The descriptive statistics of the dependent variables are shown in Table 4 based on the factor scores obtained for each participant after the CFA. At the univariate level, the distributions of all the nine variables displayed no extremes, with none was skewed or lacking variability.

Table 4: Descriptive statistics of nine dimensions of learning needs

Dependent variables: The needs of ...	Mean	SD	Skewness	Kurtosis
Transparency	-0.014	0.533	0.108	-0.733
LMS quality	-0.048	0.688	-0.363	-0.596
Technical support	-0.025	0.649	-0.115	-0.699
Relevance of learning content	-0.024	0.703	0.059	-0.775
Competence support	-0.005	0.601	0.315	-0.539
Autonomy	-0.036	0.615	-0.336	-0.611
Instructor's facilitation	-0.002	0.753	0.129	0.216
Peer collaboration	-0.013	0.792	-0.166	0.190
Sense of belonging	-0.012	0.867	-0.091	0.003

Examining the possible effects of CVO and program categories

As learners were attending different courses at different CVOs, it was necessary to examine the possible effects of CVOs and program categories. If the effect proved to be significant, then the CVOs and/or program categories should be included in the model as covariates next to socio-demographics. The results from multivariate analyses in Table A3 and Table A4 in Appendix C indicated that neither CVOs nor program categories had an effect on learners' perceptions of different dimensions of learning needs. Thus, the two categorical variables were not included in subsequent analyses.

Multivariate analysis of covariance examining effect of motivational orientations on learning needs, controlling for age groups, gender, educational levels, and ICT skills

As there were nine dependent variables, we included age groups, gender, education levels, and ICT skills as the covariates, and motivational orientation, including three categories, namely diploma-oriented, knowledge-oriented, and both diploma and knowledge oriented as the independent variables.

Checking assumptions

Box's M test, $F(90,15495)=0.932$, $p=0.661$, was not significant, suggesting that the assumption of equal covariance matrices had been met. Levene's univariate tests of homogeneity of variances presented in Table A5 in Appendix C revealed that all assumptions were upheld.

The results of the multivariate tests of group mean differences are presented in Table 5. Accordingly, as for motivational orientations, Wilks' Lambda=0.848, $F(18,306)=1.456$, $p=0.105$. Thus, the means of the nine dimensions of learning needs did not differ significantly among the three motivational orientations. Regarding the control variables, the results from the multivariate analyses showed that age groups, educational levels, and ICT skills had a significant effect on learners' perceptions of their learning needs.

Table 5: Results from multivariate tests upon the effect of motivational orientations

Effect		Value	F	Hypothesis df	Error df	p-value
Age group	Pillai's Trace	0.193	4.062	9	153	0.000
	Wilks' Lambda	0.807	4.062	9	153	0.000
Gender	Pillai's Trace	0.059	1.073	9	153	0.386
	Wilks' Lambda	0.941	1.073	9	153	0.386
Educational levels	Pillai's Trace	0.199	4.219	9	153	0.000
	Wilks' Lambda	0.801	4.219	9	153	0.000
ICT skills	Pillai's Trace	0.103	1.954	9	153	0.048
	Wilks' Lambda	0.897	1.954	9	153	0.048
Motivational orientations	Pillai's Trace	0.156	1.447	18	308	0.108
	Wilks' Lambda	0.848	1.456	18	306	0.105

Univariate tests

When the result at the multivariate level was significant, it was more informative to look at the univariate tests in order to examine the nuanced differences in the perceptions of learning needs among learners of different profiles. Accordingly, significant differences were found among different age groups regarding the needs of transparency ($F(1,161)=4.541$, $p=0.035$), LMS quality ($F(1,161)=15.73$, $p<0.001$), technical support ($F(1,161)=11.892$, $p=0.001$), and sense of belonging ($F(1,161)=4.555$, $p=0.034$). Results indicated that the older the learners, the greater the degree of need expressed for all four categories.

Regarding educational levels, significant differences were found for the needs of competence support ($F(1,161)=12.344$, $p=0.001$), instructor's facilitation ($F(1,161)=21.344$, $p<0.001$), peer collaboration ($F(1,161)=13.583$, $p<0.001$), and sense of belonging ($F(1,161)=17.854$, $p<0.001$). Further analyses revealed that the higher the degree the learners had obtained, the lower the degree of need was expressed concerning competence support, instructors' facilitation, peer collaboration, and sense of belonging.

Learners with different ICT skill levels also differed in their perceptions of learning needs regarding competence support ($F(1,161)=4.881$, $p=0.029$) and sense of belonging ($F(1,161)=8.105$, $p=0.005$). Interestingly, learners with higher ICT skills revealed lower mean scores for competence support and sense of belonging. The results are presented in Table 6.

Table 6: Parameter estimates for the independent variables

Dependent Variable	Parameter	B	SE	p-value
Transparency	Intercept	-0.197	0.303	0.516
	Age groups	0.085	0.040	0.035
	Gender	0.197	0.091	0.032
	Education levels	0.049	0.043	0.253
	ICT skills	-0.091	0.071	0.202
	Motivation orientation 1 ^a	-0.251	0.120	0.037
	Motivation orientation 2 ^a	-0.427	0.126	0.001
LMS quality	Intercept	-0.661	0.384	0.087
	Age groups	0.200	0.050	<0.001
	Gender	0.267	0.115	0.022
	Education levels	0.086	0.055	0.116
	ICT skills	-0.082	0.090	0.363
	Motivation orientation 1 ^a	-0.303	0.152	0.047
	Motivation orientation 2 ^a	-0.563	0.160	0.001
Technical support	Intercept	-0.282	0.370	0.447
	Age groups	0.167	0.049	0.001
	Gender	0.218	0.111	0.051
	Education levels	-0.056	0.053	0.287
	ICT skills	-0.058	0.087	0.506
	Motivation orientation 1 ^a	-0.175	0.146	0.233
	Motivation orientation 2 ^a	-0.339	0.154	0.029
Relevance of learning content	Intercept	0.198	0.420	0.637
	Age groups	0.039	0.055	0.478
	Gender	0.192	0.126	0.129
	Education levels	-0.074	0.060	0.216
	ICT skills	-0.026	0.099	0.796

Dependent Variable	Parameter	B	SE	p-value
	Motivation orientation 1 ^a	-0.391	0.166	0.019
	Motivation orientation 2 ^a	-0.431	0.175	0.015
Competence support	Intercept	0.664	0.334	0.049
	Age groups	0.042	0.044	0.343
	Gender	0.190	0.100	0.060
	<i>Education levels</i>	<i>-0.167</i>	<i>0.048</i>	<i>0.001</i>
	<i>ICT skills</i>	<i>-0.173</i>	<i>0.078</i>	<i>0.029</i>
	Motivation orientation 1 ^a	-0.255	0.132	0.055
	Motivation orientation 2 ^a	-0.300	0.139	0.033
Autonomy	Intercept	-0.456	0.365	0.212
	Age groups	0.073	0.048	0.131
	Gender	0.061	0.109	0.577
	Education levels	0.043	0.052	0.407
	ICT skills	0.126	0.086	0.143
	Motivation orientation 1 ^a	-0.254	0.144	0.080
	Motivation orientation 2 ^a	-0.366	0.152	0.017
Instructor's facilitation	Intercept	0.749	0.399	0.063
	Age groups	0.095	0.052	0.072
	Gender	0.169	0.120	0.160
	<i>Education levels</i>	<i>-0.262</i>	<i>0.057</i>	<i>0.000</i>
	ICT skills	-0.118	0.094	0.209
	Motivation orientation 1 ^a	-0.290	0.158	0.068
	Motivation orientation 2 ^a	-0.353	0.167	0.035
Peer collaboration	Intercept	1.196	0.432	0.006
	Age groups	-0.037	0.057	0.516
	Gender	-0.004	0.130	0.975
	<i>Education levels</i>	<i>-0.227</i>	<i>0.061</i>	<i>0.000</i>
	ICT skills	-0.192	0.102	0.060
	Motivation orientation 1 ^a	0.029	0.171	0.864
	Motivation orientation 2 ^a	-0.045	0.180	0.801
Sense of belonging	Intercept	1.880	0.466	0.000
	<i>Age groups</i>	<i>-0.131</i>	<i>0.061</i>	<i>0.034</i>
	Gender	-0.017	0.140	0.902
	<i>Education levels</i>	<i>-0.280</i>	<i>0.066</i>	<i>0.000</i>
	<i>ICT skills</i>	<i>-0.312</i>	<i>0.109</i>	<i>0.005</i>
	Motivation orientation 1 ^a	-0.063	0.184	0.734
	Motivation orientation 2 ^a	-0.022	0.194	0.909

^areference category: motivation orientation 3

5. Discussions

The paper aimed to validate the instrument measuring adult learners' needs in a blended learning environment. Subsequently, multivariate analyses of covariance were conducted to provide insights into the learning needs of adult learners of different socio-demographic and motivational profiles. The findings are discussed as follows.

First, based on a review of the literature on adult learning, the technical acceptance model, and blended learning, a theoretical framework was synthesized to guide the learning need instrument development. This resulted in the construction of nine dimensions of learning needs captured by 36 items. The CFA results showed that the instrument displayed adequate fit based on satisfactory global fit indices and factor loadings obtained. Therefore, the instrument could be employed by adult education practitioners and researchers to evaluate the learning needs of adults in order to better cater for their needs and to improve the blended course design and practices accordingly. The second-order factor analysis suggested that the higher order factors, namely existence, relatedness, and growth needed further confirmation from empirical studies and theoretical elaboration before such clustering could be established. The lack of fit could be attributed to the low loading of autonomy in the Growth dimension. It could be hypothesized that being and becoming an autonomous learner can be a preference, thus differing from learner to learner. On the other hand, the need for relevance and instructor's competence support was shared by most learners, which was confirmed in a recent study (Chambers and Whitfield, 2025). Thus, in terms of content, the need for autonomy could be slightly deviated from the other two. It was recommended that future research further validate autonomy and decide how this dimension should be interpreted under the overarching needs theory. More broadly, the weak loading of autonomy on the Growth factor raises a theoretical question about whether autonomy, as conceptualized in SDT and andragogy, constitutes a learner *need* or rather an instructional *outcome* — a distinction with significant implications for OBL design that warrants further theoretical debate.

Second, learners of three different motivational profiles, namely diploma-oriented, skills-and knowledge-oriented, and both, did not display significant differences in their learning needs. It was expected that knowledge and skills-oriented learners would express a higher degree of needs in terms of growth goals (Pintrich and Zusho, 2002), including competence support from the instructors, the relevance of the learning content, and autonomy. This, on the one hand, was somewhat contradictory to motivational theories. At the methodological level, this non-significant result may partly reflect the unequal distribution of motivational profiles in the sample, with diploma-oriented learners constituting the largest group (n=87), which may have limited statistical power to detect more nuanced differences. At the theoretical level, this finding invites a reconsideration of whether motivational orientation, as a single categorical variable, is sufficiently sensitive to capture the complexity of adult learning needs in OBL contexts. However, recent literature suggests that motivation is a relative construct rather than a fixed trait and is subject to changes due to environmental and social contexts. According to Reeve (2006), there were a number of learning conditions that may facilitate or impede an individual's motivation. Among these were motivation styles of the instructors, the affordances made to the learners, the use of external events and the expectations placed on the learners (Reeve, 2006) and perceived task value (Fryer, Bovee, and Nakao, 2014). Therefore, a possible explanation is that there has been a fluctuation in the evolution of adults' motivational orientations that could not be directly observed or noticed by the learners themselves or by the questioning method. Therefore, it was advised that future research may employ a longitudinal approach to depict learners' motivation and capture the relationships between those changes in motivation and the learning needs during the course. For example, it is hypothesized that a learner starting with an extrinsic motivation will transfer to intrinsic motivation if he or she receive substantial support in terms of learning strategies and find more relevance in the learning content.

Thirdly, in line with existing literature on adult learning, the results confirmed that adults' socio-demographics still played an important role regarding learning needs identification. More specifically, we found that age groups, ICT skills, educational levels were variables that could help explain differences in adults' learning needs. For example, learners with higher educational levels tended to be more independent learners, i.e., expressing a lesser degree of needs regarding competence support, facilitation from the instructors, peer collaboration, sense of belonging, and more autonomy in learning. This finding suggested that highly educated adult learners tended to prefer a more independent approach to learning when they were in a heterogeneous class. This pattern may be explained by the fact that highly educated adults enter OBL with well-established self-regulatory strategies and a stronger sense of academic identity, rendering external scaffolding less necessary (Knowles, 1984). From an ERG theory perspective, their growth needs are more likely to be pursued independently, whereas relatedness and existence needs recede in salience as prior academic experience reduces uncertainty about the learning environment. Despite supporting learners to be more independent and autonomous is an

important role of education, encouraging learners to involve in collaborative learning is of equal importance as research showed that collaboration in blended learning results in enriched and highly metacognitive and cognitive gains (Mebane et al., 2008). To motivate adults to invest effort in the collaborative learning, Vanslambrouck et al. (2018) showed that the instructors should make explicit the task values or the benefits of engaging in such interactions as a cost-benefits mechanism might come into play given that adults need to combine their learning with life and work responsibilities.

On the contrary, older learners expressed higher existential needs including the transparency, LMS quality, technical support as well relatedness needs, i.e., sense of belonging (Ke and Kwak, 2013). Thus, in catering for the learning needs of adults of different profiles participating in the same program, the instructors should pay more attention to these differences. Differentiated instructions with various choices of learning activities and learning paths aimed at reaching the same learning objectives could be a possible approach. In so doing, the learners would be more motivated to stay the course through.

6. Limitations

First, due to the nature of the data collection method, i.e., convenience sampling, it should be acknowledged that the findings cannot not be generalized. Second, the sample was skewed in terms of program type, with pedagogical programs (Specific Teacher Training and Freelance Coaching) accounting for over 60% of participants, which may have introduced program-specific patterns in learning need profiles that are not representative of the broader adult learner population. Third, the gender distribution was unequal, with female participants constituting approximately 69% of the sample, which may reflect the nature of certain CVO programs (e.g., childcare, teaching) rather than the adult learner population at large. These characteristics should be considered when interpreting the findings and when applying the validated instrument to other adult education contexts. Moreover, the researchers were not successful in recruiting learners of different motivational profiles as expected, hence a clear picture of how adult learners differed in their learning needs as a function of motivation could not be presented. Nevertheless, initial findings from the study revealed that motivational orientations were not significantly related to learning needs identification. Therefore, it is encouraged that future research might adopt a more valid approach to track the motivational fluctuation of adult learners during the course so that helpful implications can be offered to instructors and instructional designers. Finally, as the data were collected at the end of the program, the identification of learning needs might have been somewhat influenced. Although we believe that at this point the learners could more accurately specify their needs after a process of engaging with and experiencing the challenges and difficulties in their blended courses, it could be worthwhile to track adults' learning needs from the beginning so that prompt support could be provided. That being said, monitoring adults' learning needs "on-the-go" is a strongly recommended study to examine what specific needs are urgent in which specific stage of the learning trajectory.

7. Conclusions

In this paper, an instrument measuring adults' learning needs in a blended learning environment was validated. Employing the ERG theory, we elaborated on nine learning needs dimensions underpinned by both learning theories and empirical findings. The instrument revealed satisfactory model fit and factor loadings; therefore, it could be used as a valid tool to support instructors and adult education institutions in determining their learners' needs in order to better adapt the curriculum and instructional design when necessary. Significant differences in learning needs identified among learners of different profiles also call for more attention when a needs-based curriculum is implemented. More specifically, learners of lower educational levels, older learners, and those with lower ICT skills should receive more support in the existence and relatedness need categories. The findings that higher-educated learners expressed a lesser extent of competence support in the dimension of Growth needs and Relatedness help explained why it is difficult to engage this group in a heterogeneous classroom and call for more deliberate strategies aimed at engaging them in collaborative learning within a blended learning environment.

Beyond these immediate findings, this study offered critical insights for the broader landscape of adult education. For adult education policy, these results argued against "one-size-fits-all" funding and institutional frameworks, highlighting the necessity of macro-level policies that allocate dedicated resources for digital equity, socio-emotional onboarding, and technological support for vulnerable learner demographics. In terms of OBL design, our framework provided instructional designers with an empirical blueprint to deliberately structure OBL environments—ensuring that structural coherence and technical support (Existence), collaborative learning and sense of belonging (Relatedness), and intellectual challenges (Growth) were

intentionally mapped into the curriculum. For future learner-support systems, this validated instrument can serve as an early-stage diagnostic tool within the learning management systems (LMS) to proactively deploy automated, adaptive interventions tailored to learners' unique socio-demographic and motivational profiles.

Taken together, these findings not only confirmed the utility of the ERG framework as a theoretical lens for adult learning needs but also challenge the assumption that motivational orientation alone was sufficient to predict differentiated need profiles in OBL — an assumption prevalent in SDT-based research. In this sense, the present study opened new avenues for theoretical debate regarding the interplay between motivation, prior experience, and learning needs in OBL adult education contexts. Nevertheless, it should be acknowledged that the reliance on convenience sampling and the unequal distribution of motivational profiles in the present study limited the generalizability of these findings. Future replication with more diverse and larger samples, combined with longitudinal designs, would strengthen the validity of the instrument, and yield more nuanced insights into the dynamic relationship between adult learners' motivational orientations and their learning needs across different stages of a blended program.

Acknowledgements

The authors would like to thank all the students from the eight Centrum voor Volwassenenonderwijs (CVO) in Flanders (Belgium), who have participated in the study, despite the challenges in time.

The use of AI: The authors reviewed and edited the content as required, and they take full responsibility for the publication. The authors declared no AI-tools were used to write, generate, or revise the text.

Ethics approval and consent to participate: The study did not entail interventions on adults or the implemented instructions, hence was not subject to an ethical approval. Before proceeding to the online questionnaire, participants signed the consent form which indicated their voluntary participation in the study and that the data collected to be published anonymously. The study was conducted in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Consent for publication: Before proceeding to the online questionnaire, participants signed the consent form which indicated their voluntary participation in the study and that the data collected to be published anonymously.

Availability of data and material: The datasets are available from the corresponding author on reasonable request, which is subject to an approval from the ethical committee.

Competing interests: The authors declare that they have no competing interests.

Funding: The research was funded by the SRP 28 (Vrije Universiteit Brussel).

Authors' contributions: All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by AD, AFD, CC, TW, MDG and CZ. The first draft of the manuscript was written by AD and KD, TNPP, MV and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

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Appendix A

Onderzoek 'Noden en tevredenheid van cursisten in online en gecombineerde leeromgeving'

Beste heer, mevrouw,

In het kader van een onderzoeksproject aan de Universiteit X, nodigen we u uit om deel te nemen aan ons onderzoek. Het onderzoek bestudeert de noden die cursisten hebben in een gecombineerde leeromgeving.

Doel van de vragenlijst

We nodigen u uit om deel te nemen aan een vragenlijst, om informatie te verzamelen over welke noden u ervaart tijdens het studeren in een gecombineerde leeromgeving. Deze informatie is zeer waardevol om de cursistenbegeleiding te kunnen verbeteren.

Deelname aan de vragenlijst

Er wordt een vragenlijst afgenomen. Dit zal ongeveer 20 minuten van uw tijd in beslag nemen.

Verwerking en rapportering van gegevens

De verwerking en de rapportering van de gegevens gebeurt anoniem. De verzamelde gegevens worden in alle discretie en met het nodige respect behandeld. Dit houdt in dat de gegevens niet gebruikt worden voor commerciële doeleinden en anoniem verwerkt worden in wetenschappelijke publicaties zoals rapporten, artikels en boeken.

Geïnformeerde toestemming

Door akkoord te gaan, verklaart u dat u als deelnemer aan dit onderzoek:

- de uitleg over de aard van het onderzoek hebt gelezen en dat u de mogelijkheid werd geboden om bijkomende informatie te verkrijgen;
- uit vrije wil deelneemt aan dit onderzoek;
- de toestemming geeft om het onderzoeksmateriaal op vertrouwelijke wijze te bewaren, te verwerken en erover te rapporteren;
- op de hoogte bent van de mogelijkheid om uw deelname aan het onderzoek op ieder moment stop te zetten;

Men heeft mij voldoende ingelicht over dit onderzoek. Ik weet dat ik bij verdere vragen steeds contact kan opnemen via << information omitted for peer review >>

☐ Ik ga akkoord met deelname aan dit vragenlijstenonderzoek

Deel 1. Achtergrondinformatie

1. Geslacht

- ☐ Man
☐ Vrouw

2. Geboortjaar: _____

3. Nationaliteit: _____

4. Burgerlijke staat:

- ☐ Ik ben getrouwd
☐ Ik ben gescheiden
☐ Ik ben weduwe of weduwnaar
☐ Ik ben ongehuwd
☐ Ik ben alleenstaand
☐ Ik ben samenwonend

- ☐ Andere: _____
5. Welke van de volgende omschrijvingen geeft je huidige werksituatie het beste weer?
- ☐ Voltijds tewerkgesteld
 - ☐ Deeltijds tewerkgesteld
 - ☐ Werkzoekende
 - ☐ Gepensioneerd of bruggepensioneerd
 - ☐ Voltijds student
 - ☐ Huisvrouw/huisman
 - ☐ Andere: _____
6. Duid jouw hoogst behaalde diploma aan
- ☐ Geen
 - ☐ Basisonderwijs
 - ☐ Lager secundair onderwijs
 - ☐ Hoger secundair onderwijs
 - ☐ Professionele bachelor of graduaat
 - ☐ Academische bachelor of kandidaat
 - ☐ Master of licentiaat
 - ☐ Doctor
 - ☐ Andere: _____
7. In welk centrum volg je momenteel les?
Meer specifiek, welk centrum heeft jou in contact gebracht met deze vragenlijst?
- _____
8. Hoe heet de opleiding die je momenteel volgt?
- _____
9. Wanneer ben je aan deze opleiding begonnen? (jaar + semester indien mogelijk)
- _____
10. Heb je al ervaring met gecombineerd of afstandsonderwijs?
- ☐ Ja ☐ Neen
11. Hoeveel modules heb je al afgewerkt in deze opleiding? _____
12. Over het algemeen, hoe schat u uw ICT-vaardigheden in (vb. opzoeken op internet, werken met Microsoft Office, sociale media zoals Facebook en Twitter)
- ☐ Beginner ☐ Gemiddeld ☐ Gevorderd
13. Waarom heeft u zich ingeschreven voor deze opleiding of cursus? Duid de meest belangrijke reden aan.
- ☐ Ik wou graag het diploma behalen.
 - ☐ Ik wou graag mijn kennis en vaardigheden verbeteren voor mijn huidige of toekomstige job.
 - ☐ Ik wou graag nieuwe mensen leren kennen en nieuwe vrienden maken.
 - ☐ Ik wou breken met de sleur en verveling in mijn (dagelijks) leven.
 - ☐ Ik wou graag nieuwe kennis en vaardigheden opdoen.
 - ☐ Ik volg deze cursus omdat dit me voorbereid om me in te zetten voor de gemeenschap.
 - ☐ Ik volg deze cursus omdat ik moet van mijn werkgever of om te kunnen genieten van sociale voordelen.
14. Welke gemiddelde score behaalde je reeds gedurende deze opleiding?
- Opgelet, deze score is uitgedrukt in een score op 20. Indien je een andere score kreeg, gelieve “andere” aan te duiden en in te vullen. Indien je nog geen punten kreeg, gelieve **vraag 15** te beantwoorden.
- ☐ ≤ 10
 - ☐ 11-12
 - ☐ 13-14
 - ☐ 15-16
 - ☐ 17-18
 - ☐ 19-20
 - ☐ Andere: _____

Niet van toepassing → ga naar vraag 15

15. Vul deze vraag enkel in indien je vraag 14 niet kon beantwoorden wegens ‘niet van toepassing’.

Hoe verwacht je gemiddeld te scoren doorheen deze opleiding? Opgelet, deze score is uitgedrukt in een score op 20. Indien je centrum met een ander scoresysteem werkt, gelieve "andere" aan te duiden en in te vullen.

- ☐ ≤ 10
- ☐ 11-12
- ☐ 13-14
- ☐ 15-16
- ☐ 17-18
- ☐ 19-20
- ☐ Andere: _____

Deel 2. 1. Duidelijke verwachtingen

Welke noden ervaar je in verband met het creëren van duidelijke verwachtingen tijdens de cursus? We willen graag weten in welke mate je nood hebt aan duidelijkheid over wat van jou verwacht wordt tijdens de cursus. Duid aan in welke mate je akkoord gaat met de volgende stellingen.

(1) helemaal niet akkoord, (2) niet akkoord, (3) neutraal, (4) akkoord, tot (5) helemaal akkoord

	1	2	3	4	5
Ik heb nood aan een duidelijk idee over wat er van mij verwacht wordt in deze cursus.					
Ik vind het nodig dat ik gemakkelijk te weten kan komen welke kwaliteit de docent van mijn werk verwacht.					
Ik vind het nodig dat de docent duidelijke instructies geeft over wat hij/zij van de studenten verwacht vanaf het begin van de cursus.					
Ik vind het nodig dat ik gemakkelijk kan ontdekken wat er van mij verwacht wordt.					

Deel 2.2. Het leerplatform

Welke behoeftes heb je tijdens het werken met het online leerplatform (vb. Moodle of Smartschool)?

Duid aan in welke mate je tevreden bent over de volgende zaken.

(1) helemaal niet akkoord, (2) niet akkoord, (3) neutraal, (4) akkoord, tot (5) helemaal akkoord

	1	2	3	4	5
Ik vind het nodig dat ik de informatie op het leerplatform gemakkelijk kan terugvinden).					
Ik vind het nodig dat de aanwijzingen en navigatie op het leerplatform duidelijk zijn).					
Ik heb behoefte aan overzichtelijke informatie en inhoud op het leerplatform.					
Ik heb behoefte aan een goede gebruikersinterface op het leerplatform.					

Deel 2. 3. Technische hulp

Wat vind je nodig op vlak van technische ondersteuning? Duid aan in welke mate je nood hebt aan de volgende zaken.

(1) helemaal niet akkoord, (2) niet akkoord, (3) neutraal, (4) akkoord, tot (5) helemaal akkoord

	1	2	3	4	5
Ik vind het nodig dat ik zo weinig mogelijk technische problemen heb tijdens de cursus.					
Ik vind het nodig dat ik gemakkelijk technische hulp kan vragen.					
Ik vind het nodig dat ik weet waar ik hulp kan vragen in geval van technische problemen.					
Ik vind het nodig dat ik tijdig hulp krijg bij technische problemen.					

Deel 2. 4. Relevantie

In welke mate heb je nood aan relevante onderwerpen tijdens de cursus? Relevante onderwerpen zijn thema's die jou interesseren.

Duid aan in welke mate je akkoord gaat met de volgende stellingen.

(1) helemaal niet akkoord, (2) niet akkoord, (3) neutraal, (4) akkoord, tot (5) helemaal akkoord

	1	2	3	4	5
Ik vind het nodig dat ik mijn kennis en vaardigheden in het dagelijks leven (vb. thuis, op het werk) kan inzetten.					
Ik vind het nodig dat ik onderwerpen kan studeren die mij interesseren.					
Ik vind het nodig dat ik mijn studies kan linken aan mijn dagelijks leven.					
Ik vind het nodig dat ik mijn persoonlijke ervaringen kan toepassen in de cursus.					

Deel 2. 5. Leerondersteuning

In welke mate heb je behoefte aan ondersteuning van de docent?

Duid aan in welke mate je akkoord gaat met de volgende stellingen.

(1) helemaal niet akkoord, (2) niet akkoord, (3) neutraal, (4) akkoord, tot (5) helemaal akkoord

	1	2	3	4	5
Ik vind het nodig dat de docent mij voldoende feedback geeft.					
Ik heb nood aan tijdige begeleiding van de docent.					
Ik vind het nodig dat de docent mij opdrachten geeft die op mijn capaciteiten zijn afgestemd.					
Ik vind het nodig dat de docent voldoende mogelijkheden voorziet om theorie om te zetten in de praktijk.					

Deel 2.6. Zelfstandigheid

In welke mate vind je het nodig dat je zelfstandig en autonoom kan studeren? Duid jouw mening hierover aan.

(2) helemaal niet akkoord, (2) niet akkoord, (3) neutraal, (4) akkoord, tot (5) helemaal akkoord

	1	2	3	4	5
Ik vind het nodig om te studeren wanneer het mij past.					
Ik vind het nodig dat ik controle heb over mijn eigen leerproces.					
Ik vind het nodig dat ik een belangrijke rol in mijn eigen leerproces speel.					
Ik heb behoefte om mijn leerproces op mijn eigen manier aan te pakken.					

Deel 2.7. Betrokkenheid van de docent

In welke mate vind je de betrokkenheid van de docent tijdens de online leermomenten nodig ? Duid jouw mening hierover aan.

(1) helemaal niet akkoord, (2) niet akkoord, (3) neutraal, (4) akkoord, tot (5) helemaal akkoord

	1	2	3	4	5
Ik vind het nodig dat de docent alle cursisten aanmoedigt om betrokken te zijn bij en om productief deel te nemen aan online gesprekken.					
Ik vind het nodig dat de docent alle cursisten aanstuurt om gefocust te blijven op de online opdracht.					
Ik vind het nodig dat de docent alle cursisten aanmoedigt om online nieuwe concepten in deze cursus te ontdekken.					

	1	2	3	4	5
Ik heb nood aan ondersteuning die het online groepsgevoel tussen de cursisten versterkt.					

Deel 2.8. Samenwerking

Welke noden ervaar je tijdens het samenwerken met medecursisten? Samenwerking kan verwijzen naar groepswerk of groepspresentatie.

(1) helemaal niet akkoord, (2) niet akkoord, (3) neutraal, (4) akkoord, tot (5) helemaal akkoord

	1	2	3	4	5
Ik vind het nodig dat ik samen kan werken met medecursisten aan taken of projecten.					
Ik heb behoefte om mijn ideeën met mijn medecursisten te bespreken.					
Ik heb nood aan feedback van mijn medecursisten.					
Ik vind het nodig dat ik toegang heb tot het werk van medecursisten (vb. essays, blogs, wiki's, ingediende opdrachten, mondelinge presentaties).					

Deel 2.9. Gemeenschapsgevoel

In welke mate vind je het nodig om je verbonden te voelen met jouw medecursisten? Duid jouw mening aan.

(1) helemaal niet akkoord, (2) niet akkoord, (3) neutraal, (4) akkoord, tot (5) helemaal akkoord

	1	2	3	4	5
Ik vind het nodig dat alle cursisten voor elkaar zorgen tijdens deze cursus.					
Ik vind het nodig dat ik me verbonden voel met mijn medecursisten.					
Ik vind het nodig dat ik op mijn medecursisten kan rekenen.					
Ik heb nood aan hulp van mijn medecursisten.					

SLOT

Hartelijk bedankt voor jouw medewerking aan dit onderzoek.

Tenslotte stellen we jou nog een laatste vraag. Werk je graag mee aan vervolgonderzoek? Of word je graag op de hoogte gehouden van de resultaten van dit onderzoek? Of beter, maak je graag kans op het winnen van een prijs verbonden aan de deelname aan dit onderzoek?

Duid dan aan wat voor jou van toepassing is.

- ☐ Ik ben bereid om mee te werken aan vervolgonderzoek

- ☐ Ik word graag op de hoogte gehouden van de resultaten van dit onderzoek
- ☐ Ik maak graag kans om een prijs te winnen verbonden aan de deelname aan dit onderzoek.

Vul hieronder jouw naam en e-mailadres in.

Naam:

E-mailadres:

Appendix B

Part 1. Background information

16.

- ☐ Male
- ☐ Female

17. Year of birth: _____

18. Nationality: _____

19. Civil status:

- ☐ I am married
- ☐ I am divorced
- ☐ I am a widow/widower
- ☐ I am unmarried
- ☐ I am single
- ☐ I am living with a partner
- ☐ Other: _____

20. Which of the following descriptions best reflects your current employment situation?

- ☐ Employed full-time
- ☐ Employed part-time
- ☐ Job seeker
- ☐ Retired or early retired
- ☐ Full-time student
- ☐ Homemaker
- ☐ Other: _____

21. Please indicate your highest obtained degree/diploma

- ☐ None
- ☐ Primary education
- ☐ Lower secondary education
- ☐ Higher secondary education
- ☐ Professional bachelor's degree or associate degree
- ☐ Academic bachelor's degree
- ☐ Master's degree
- ☐ Doctor degree
- ☐ Other: _____

22. At which center are you currently following the classes?

More specifically, which center has contacted you for this questionnaire?

23. Which program are you following?

24. When did you begin the program? (year + semester if applicable)

25. Do you have previous online/blended learning experience?

- ☐ Yes
- ☐ No

26. How many modules have you completed in this program? _____

27. In general, how would you rate your ICT (Information and Communication Technology) skills (e.g., searching the Internet, using Microsoft Office, social media such as Facebook and Twitter)?

☐ Beginner

☐ Intermediate

☐ Advanced

28. Why did you enroll for the program? Please indicate the most important reason (s).

- ☐ I'd like to get the diploma.
- ☐ I'd like to improve my knowledge and skills for my current and/or future job.
- ☐ I'd like to make new friends and meet new people.
- ☐ I'd like to get more fun and relief from my daily routine and boredom.
- ☐ I'd like to learn new knowledge and skills.
- ☐ I participate because this course will prepare me for service to the community.
- ☐ I participate because I need to comply with my employer's policy or to secure social benefits.

29. What average score have you obtained so far during this course/program?

Please note that this score should be expressed on a **20-point scale**. If you received a score using a different grading system, please select **"Other"** and specify it. If you have **not yet received any grades**, please proceed directly to **Question 15**.

- ☐ ≤ 10
- ☐ 11-12
- ☐ 13-14
- ☐ 15-16
- ☐ 17-18
- ☐ 19-20
- ☐ Other: _____

Not applicable → Go to question 15

30. Please answer this question only if you could not answer Question 14 because it was "not applicable."

What average score do you expect to achieve throughout this course/program?

Please note that this score should be expressed on a **20-point scale**. If your center uses a different grading system, please select **"Other"** and specify the grading scale used.

- ☐ ≤ 10
- ☐ 11-12
- ☐ 13-14
- ☐ 15-16
- ☐ 17-18
- ☐ 19-20
- ☐ Other: _____

Part 2. 1. Transparency

What needs do you have regarding setting clear expectations during the course? We would like to know to what extent you need clarity about what is expected from you during the course.

Please indicate the extent to which you agree with the following statements, using the scale below:

(1) totally disagree, (2) disagree, (3) neutral, (4) agree, or (5) totally agree

	1	2	3	4	5
I have a clear idea of where I am going and what is expected of me in this course.					
It is always easy to know the standard of work expected.					
The instructor makes it clear right from the start what they expected from students.					

	1	2	3	4	5
It is easy to find out what is expected of me in this course.					

Part 2.2. The learning platform

What needs do you have while working with the online learning platform (e.g., Modell or Smartschool)?

Please indicate the extent to which you agree with the following statements, using the scale below:

(1) totally disagree, (2) disagree, (3) neutral, (4) agree, or (5) totally agree

	1	2	3	4	5
I can find the information on the learning platform easily.					
The program directions and navigations are clear.					
The material and content uploaded on the learning platform are well-organized.					
The learning platform's graphical user interface is good.					

Part 2. 3. Technical support

What do you consider as necessary regarding technical support. Please indicate the extent to which you agree with the following statements, using the scale below:

(1) totally disagree, (2) disagree, (3) neutral, (4) agree, or (5) totally agree

	1	2	3	4	5
I have as few as technical issues in this course (program) as possible.					
I can get technical support when I need.					
I know where to ask for help when I had any technical issues.					
Technical support (team) responds to my issues in a timely manner.					

Part 2. 4. Relevance

To what extent do you need relevant topics during the course?

Relevant topics are subjects or themes that interest you personally.

Please indicate the extent to which you agree with the following statements, using the scale below:

(1) totally disagree, (2) disagree, (3) neutral, (4) agree, or (5) totally agree

	1	2	3	4	5
I can relate what I learn to my life outside the campus.					
I am able to pursue topics that interest me.					
I link class work to my life outside the campus.					
I can apply my everyday experiences in class.					

Part 2. 5. Learning support

To what extent do you need the instructors' support?

Please indicate the extent to which you agree with the following statements, using the scale below:

(1) totally disagree, (2) disagree, (3) neutral, (4) agree, or (5) totally agree

	1	2	3	4	5
The instructor gives learners adequate feedback and enable them to calculate and track their performance.					
The instructor offers learners timely guidance.					
The instructor provides learners tasks and assignments appropriate to learners' capacity and prior experience.					
The instructor provides learners opportunities to apply knowledge from the course into practice.					

Part 2.6. Autonomy

To what extent do you think it is important to be able to study independently and autonomously? Please indicate your opinion

(1) totally disagree, (2) disagree, (3) neutral, (4) agree, or (5) totally agree

	1	2	3	4	5
I can work during times I find convenient.					
I am in control of my learning.					
I play an important role in my learning.					

	1	2	3	4	5
I approach learning in my own way.					

Part 2.7. Facilitation

To what extent do you think the instructor's involvement during online learning sessions necessary?

Please indicate the extent to which you agree with the following statements, using the scale below:

(1) totally disagree, (2) disagree, (3) neutral, (4) agree, or (5) totally agree

	1	2	3	4	5
The instructor helps to keep course participants engaged and participating in productive dialogue.					
The instructor helps keep the course participants on task in a way that helped me to learn.					
The instructor encourages course participants to explore new concepts in this course.					
Instructor actions reinforce the development of a sense of community among course participants.					

Part 2.8. Peer interaction

What needs do you experience when collaborating with fellow learners? Collaboration may refer to group work or group presentations.

Please indicate the extent to which you agree with the following statements, using the scale below:

(1) totally disagree, (2) disagree, (3) neutral, (4) agree, or (5) totally agree

	1	2	3	4	5
I can work collaboratively with peers in a project/task.					
I can discuss my ideas with other students.					
I can receive feedback from other students to improve my work.					
I can have access to other students' output, e.g. essays in blogs or wikis, submitted assignments, or oral presentation.					

Part 2.9. Sense of belonging

Please indicate the extent to which you agree with the following statements, using the scale below:

(2) totally disagree, (2) disagree, (3) neutral, (4) agree, or (5) totally agree

	1	2	3	4	5
I have a feeling that students in this course care about each other.					
I feel connected to other in this course.					
I feel that I can rely on others in this course.					
I feel confident that others will support me.					

Appendix C

Table A1: Factor loadings for the learners' needs instrument with scales treated as continuous and ordinal

Scales	Items	Factor loadings		Composite reliability (ω)
		Continuous scale	Ordinal scale	
Transparency	n1	0.556	0.604	0.76
	n2	0.777	0.826	
	n3	0.638	0.710	
	n4	0.682	0.813	
LMS quality	n5	0.709	0.819	0.84
	n6	0.816	0.906	
	n7	0.807	0.902	
	n8	0.659	0.792	
Technical support	n9	0.596	0.728	0.84
	n10	0.836	0.858	
	n11	0.831	0.876	
	n12	0.711	0.837	
Relevance of learning content	n13	0.726	0.808	0.79
	n14	0.627	0.727	
	n15	0.775	0.769	
	n16	0.648	0.885	
Competence support	n17	0.565	0.670	0.76
	n18	0.753	0.769	
	n19	0.708	0.740	
	n20	0.623	0.743	
Autonomy	n21	0.596	0.722	0.86
	n22	0.868	0.890	
	n23	0.840	0.932	
	n24	0.772	0.810	
Instructor's facilitation	n25	0.779	0.799	0.84
	n26	0.931	0.920	
	n27	0.845	0.820	
	n28	0.401	0.813	

Scales	Items	Factor loadings		Composite reliability (ω)
		Continuous scale	Ordinal scale	
Peer collaboration	n29	0.788	0.845	0.84
	n30	0.931	0.916	
	n31	0.845	0.905	
	n32	0.401	0.733	
Sense of belonging	n33	0.886	0.918	0.93
	n34	0.903	0.937	
	n35	0.874	0.896	
	n36	0.840	0.903	

Table A2: The second order factor and the respective components

Higher order factor	First order factor	Factor loadings
Existence	Transparency	0.691
	LMS quality	0.728
	Technical support	0.763
Relatedness	Peer collaboration	0.803
	Sense of belonging	0.886
	Instructor's facilitation	0.713
Growth	Relevance of learning content	0.599
	Competence support	0.825
	Autonomy	0.322

Table A3: Multivariate analysis: Effect of CVO on adults' perceptions of learning needs

Effect		Value	F	Hypothesis df	Error df	p-value
CVO B ^a	Pillai's Trace	0.027	.572	9	189	0.819
	Wilks' Lambda	0.973	.572	9	189	0.819
CVO C ^a	Pillai's Trace	0.024	.514	9	189	0.864
	Wilks' Lambda	0.976	.514	9	189	0.864
CVO D ^a	Pillai's Trace	0.043	.946	9	189	0.487
	Wilks' Lambda	0.957	.946	9	189	0.487
CVO E ^a	Pillai's Trace	0.054	1.203	9	189	0.295
	Wilks' Lambda	0.946	1.203	9	189	0.295
CVO F ^a	Pillai's Trace	0.077	1.744	9	189	0.082
	Wilks' Lambda	0.923	1.744	9	189	0.082
CVO G ^a	Pillai's Trace	0.034	.740	9	189	0.672
	Wilks' Lambda	0.966	.740	9	189	0.672
CVO H ^a	Pillai's Trace	0.014	.305	9	189	0.973
	Wilks' Lambda	0.986	.305	9	189	0.973

^areference category: CVO A

Table A4: Multivariate analysis: Effect of program categories on adults' perceptions of learning needs

Effect		Value	F	Hypothesis df	Error df	p-value
Program category 1^a	Pillai's Trace	0.070	1.615	9	194	0.113
	Wilks' Lambda	0.930	1.615	9	194	0.113
Program category 2^a	Pillai's Trace	0.060	1.386	9	194	0.196
	Wilks' Lambda	0.940	1.386	9	194	0.196
Program category 3^a	Pillai's Trace	0.021	.463	9	194	0.898
	Wilks' Lambda	0.979	.463	9	194	0.898

^areference category: program category 4

Table A5: Levene's tests of equality of covariance matrices

Dependent variables	F	df1	df2	p-value
Transparency	1.002	2	165	0.369
LMS quality	0.518	2	165	0.597
Technical support	0.940	2	165	0.393
Relevance of learning content	0.016	2	165	0.984
Competence support	0.281	2	165	0.755
Autonomy	1.103	2	165	0.334
Instructor's facilitation	0.674	2	165	0.511
Peer collaboration	1.930	2	165	0.148
Sense of belonging	0.578	2	165	0.562