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Translation, adaptation, psychometric study and proposal of a short version of the Mobile Learning Perception Scale .

Traducción, adaptación, estudio psicométrico y propuesta de una versión breve de la Mobile Learning Perception Scale.

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Summary: Mobile learning (M-Learning) enhances learning thanks to the versatility of mobile technologies across time and space. Understanding how health sciences teachers perceive M-Learning would facilitate the incorporation of this methodology in the classroom. Therefore, it is essential to have an instrument for assessing this construct in our country. The objective of this study is to conduct a cross-cultural adaptation, psychometric validation, and proposal of the short version of the Mobile Learning Perception Scale (MLPS) questionnaire in Argentine Spanish. An instrumental study was conducted. The 26 items of the MLPS were translated and adapted, ensuring the cultural appropriateness of the construct. Expert judges then assessed the clarity and relevance of the Spanish version of the MLPS, and the adjusted scale was completed by a sample of 305 Argentine teachers. Three models were tested using confirmatory factor analysis (CFA): the original 3-factor model, a unidimensional model, and a short version (items with factor loadings >.80 and R2 >.65). The short 10-item version of the scale showed better fit indices and acceptable error. The Mean Variance Extracted (MVE) study yielded a satisfactory value of 0.96. The short 10-item version of the MLPS in Argentine Spanish is a valid and reliable instrument for use in educational and research settings with healthcare educators.

Keywords: perception of mobile learning, psychometric study, university teachers.

Resumen: El Mobile Learning (M-Learning) favorece el aprendizaje gracias a la versatilidad en tiempo y espacio de las tecnologías móviles. Conocer la percepción del M-Learning de los docentes de áreas de Ciencias de la Salud facilitaría la incorporación de esta metodología en el aula, por lo cual, resulta indispensable contar con un instrumento para la evaluación de este constructo en nuestro país. El objetivo de este estudio es realizar la adaptación transcultural, validación psicométrica y propuesta de la versión corta del cuestionario "Mobile Learning Perception Scale (MLPS)", al español argentino. Se realizó un estudio de tipo instrumental. Los 26 ítems del MLPS fueron traducidos y adaptados garantizando la adecuación cultural del constructo. Luego, jueces expertos valoraron la claridad y pertinencia de la versión del MLPS en español y la escala ajustada fue respondida por una muestra de 305 docentes argentinos. A partir de un Análisis Factorial Confirmatorio (AFC) se pusieron a prueba 3 modelos: el original de 3 factores, un modelo unidimensional y una versión breve (ítems con carga factorial >.80 y R2>.65). La versión breve de la escala, compuesta por 10 ítems, presentó mejores índices de ajuste y un error aceptable. El estudio de la Varianza Media Extractada arrojó un valor satisfactorio de VME=0.96. La versión breve de 10 ítems del MLPS en español argentino es un instrumento válido y confiable para ser utilizado en contextos educativos y de investigación en docentes de la salud.

Palabras clave: percepción de aprendizaje móvil, estudio psicométrico, docentes universitarios.

1. Introduction

Entertainment and social interaction have been evolving over the past few decades, especially in the area of information and communication technologies (ICTs). These tools are changing daily, influencing our daily lives and facilitating our work in various areas, with education being one of the most favored scenarios (1). Mobile learning, defined as a teaching strategy based on mobile electronic devices, has as its main characteristic the ability to offer physical and temporal flexibility in knowledge acquisition. At the same time, it optimizes individual and collaborative work, broadening the cultural experience of all participants in the educational dynamic (2-3).

There is vast scientific evidence supporting that this digital revolution can generate important learning spaces, improving the link between formal and informal education, generating equal opportunities in populations with little access or difficulties with in-person learning (4-5). Thanks to mobile technologies, learning can be explored from different perspectives, allowing students to establish diverse connections in a versatile and effective way, for example, through access to classes and materials without restrictions of time and physical space (1, 4). Among the various benefits observed, the implementation of AM favors constructivist learning, promotes collaborative work, facilitates instant feedback, increases motivation and participation, and enhances knowledge acquisition processes (6-9). In addition, it offers great facilities for the teacher, such as the optimization of face-to-face time, communication, and immediate correction (4).

In the field of medical education, Walsh (10) also highlights these advantages, such as flexible access, learning situated in clinical contexts and the possibility of continuous self-assessment, although he warns about risks linked to technological dependence and the distraction that can be generated by the use of mobile devices. In addition, a recent systematic review highlights that the adoption of AM in universities has been consolidated as an international field of research, pointing out as key factors the intention to use, attitude and compatibility with the needs of students (11).

Hwang & Huang (12) recognize that mobile learning contributes to the development of cognitive skills, critical thinking, analysis, and information synthesis in students. These benefits are evident when the content, activity design, appropriate technology, and availability of teachers, students, and educational institutions are aligned. Despite all the benefits of implementing technologies, the current educational system must identify the various challenges that may affect the implementation of mobile learning (4). Some of the most common complications are associated with technology, such as problems inherent to storage, battery life, small screens, wireless bandwidth, and internet access. Other problems are related to people, since they may perceive mobile technology as a threat that would take away their control over the teaching-learning process (7, 9).

The use and assessment of skills, competencies, and one's own experiences can be determining factors in any process of appropriation of the tools (13). In this sense, Sophonhiranrak (14) points out that the perceptions and attitudes of students, teachers, and parents towards mobile devices can be the determining factor in their use, since they reflect beliefs, assumptions, and ideologies about how technologies impact learning. A negative perception may respond in part to generational differences; the fact that teachers do not know the digital language of their students results in the impossibility of maximizing its advantages (15). Furthermore, the shift from teacher-centered learning to student-centered learning could generate insecurity in the teacher, believing that his or her role can be replaced by technology (8). Likewise, the lack of knowledge and experience when using mobile teaching tools could harm their implementation, by perceiving mobile devices as an entertainment technology and not as a potential resource (7).

Finally, Domingo & Garganté (8) state that favorable teacher perceptions are positively correlated with its actual implementation in the classroom. Therefore, evaluating and understanding teachers' perceptions is essential to promote the effective incorporation of AM .

For the evaluation of AM, the following instruments have been developed in different parts of the world:

- *Teachers' Attitudes toward the Use of Mobile Technologies in the Classroom* (TAMTC) by Chao in 2015 (16), developed in Taiwan. This instrument focuses on understanding teachers' attitudes through three dimensions: Cognitive, Affective, and Behavioral, and presented adequate internal consistency for the set of 20 items (α=.85) in its original study.
- A scale for assessing ML Acceptance, by Yi et al. in 2009 (17), also developed in Taiwan. This scale contains 12 items grouped into 5 dimensions: Information Quality, System Quality, Perceived Value, User Satisfaction, and Reuse Intention.
- Then, Turkish researchers Ozdamli & Uzunboylu in 2015 (18) published the *"Mobile Learning Perception Scale"* (MLPS), which consists of 26 items grouped into 3 dimensions. This scale was used in numerous studies in different countries and showed good psychometric performance in terms of its validity and reliability.
- In 2013, Roche (19) adapted the MLPS to the English language, also finding 3 dimensions, although with a structure that did not theoretically coincide with the original version.
- Starting from this last scale, Italian researchers in 2017 (15) proposed a brief version of 13 items, also grouped into 3 dimensions: (Flexibility-Convenience, Communication and Strategies-Classroom Techniques), which also differed from the previous proposals.

Existing scales for assessing mobile learning have both conceptual and methodological limitations. The original MLPS (18) , created in Turkish and published in English, although psychometrically sound, was developed in a distinct cultural and educational context, which restricts its applicability in other settings. The English (19) and Italian (15) adaptations showed divergent factor structures and evidence of partial validity, reflecting a lack of theoretical consensus on the underlying dimensions of the construct. Furthermore, there are no validations in Spanish or studies conducted in Latin America, which highlights an empirical gap in the measurement of mobile learning in the region.

In this context, the present research is justified, whose objective is to translate and adapt the MLPS to the Argentine context, analyze its psychometric functioning in Health Sciences teachers and propose a brief version , guaranteeing the linguistic and cultural equivalence of the instrument. Likewise, a recent systematic review points out the scarcity of Latin American studies on the adoption of Mobile Learning, which reinforces the relevance and timeliness of this work (11).

2. Methods

An instrumental study (20) was conducted , focusing on the translation, adaptation and validation of a scale from English to Spanish, as well as the study of its psychometric functioning. Six specialists participated in the translation of the scale into Spanish, who worked on harmonization and back-translation. Then, a group of 27 expert judges (specialists in the area of technologies and virtual environments, teachers, etc.) reviewed the Spanish version, providing suggestions regarding the wording of the items. Next, a sample of 305 university professors from different provinces of Argentina was intentionally chosen. This group was made up of 185 women (60.7%) and 120 men (39.3%) with ages between 25 and 74 years, with an average age of 47 years (SD = 10.16).

A sociodemographic questionnaire was administered to determine teachers' age, gender, profession or academic degree, years of teaching experience, and place of residence. Teachers were also

asked how frequently they used virtual learning in their classes. The translated version of the Mobile Learning Perception Scale (MLPS) was used. This instrument, originally developed in the Turkish Republic of Cyprus to assess teachers' perceptions of mobile learning (18) , consists of 26 items answered using a five-point Likert-type scale (1 = Strongly disagree to 5 = Strongly agree). The scale showed adequate validity among Turkish teachers, with a 3-dimensional structure that explained 66.95% of the total variance. The dimensions are: 1. Convenience of mobile technologies based on objectives (8 items); 2. Suitability of mobile learning to a particular subject (9 items); and 3. Methods of implementing AM and the appropriateness/suitability of communication tools (9 items). Regarding reliability, the total scale had an internal consistency of α=.97, and adequate values were found for each dimension: α=.89; α=.94; and α=.94, respectively.

Regarding the procedures, the authors of the MLPS (18) were contacted , requesting their authorization to translate, apply, and validate the instrument for the evaluation of AM in Argentine teachers. The project was then evaluated by the Ethics Committee of the Universidad Adventista del Plata, and was approved under resolution 1.9/2019. Informed consent was then requested from all professionals who participated as expert judges in different stages of the scale review, and from the teachers who made up the study sample. The objectives of the study were explained to each teacher, and it was made clear that participation was voluntary and that the data would be kept confidential, maintaining their anonymity.

Regarding data collection and analysis, the 26 items of the MLPS (18) were translated and adapted to ensure the cultural appropriateness of the construct. Two bilingual translators translated the instrument into Spanish, and then a consensus version was prepared by a third bilingual translator who was familiar with the study objectives. With the collaboration of a fourth translator, the American version by Roche (19) was consulted , who adjusted the Turkish scale published in English more rigorously into English, since this is his native language. Later, two other native English-speaking translators performed the back translation to ensure that the correct meaning was obtained. The differences were discussed to arrive at the final version of the instrument in Spanish according to the Arribas model (21) .

The Spanish version was administered to expert judges, who made suggestions that led to changes in the item wording, seeking semantic equivalence. The adjusted scale was then completed virtually by a sample of 305 Argentine teachers using a Google form, which was then sent via instant messaging (WhatsApp).

The psychometric performance of the instrument was studied in terms of its validity and reliability (22) . Using JASP Software (23) , a Confirmatory Factor Analysis was performed, since it is currently the most appropriate technique to validate a foreign questionnaire (24) . Two factor models were compared: on the one hand, the 3-factor structure reported by the original authors was replicated (18) , and on the other hand, a unidimensional model was tested. A brief scale was also designed, keeping those items that presented a factor loading above .80 and an R2 value greater than .65 (25) .

To estimate the goodness of fit level of the proposed models, the Chi square statistic (χ2), the normed fit index (NFI), the non-normed fit index (NNFI), the comparative fit index (CFI), the incremental fit index (IFI), the goodness of fit index (GFI), the root mean square error (RMSEA), and the Akaike index (AIC) were taken into account. To consider a good fit, it is estimated that the χ2 statistic on the degrees of freedom must present values lower than 4 (26) ; the RMSEA be less than or equal to .08 (27) ; the NFI, NNFI, CFI, IFI and GFI greater than .90 for an acceptable fit and values equal to or greater than .95 for an optimal fit (28-29) .

On the other hand, internal consistency was calculated using Cronbach's Alpha statistic. Likewise, the Average Variance Extracted (AVE) was estimated from the standardized estimates and measurement errors, which must be greater than 0.5, indicating that the construct explains more than half of the variance of all the indicators that comprise it (24).

In order to evaluate different psychometric aspects of the short version of the scale, a descriptive analysis of the items (mean, deviation, skewness, and kurtosis) was performed using SPSS software. The homogeneity index was assessed through the corrected item-scale correlation (IHC), which will allow studying the functioning of the items in terms of their discriminatory capacity. An average of the 10 items of the short version was performed to obtain a total score per subject in the Mobile Learning variable.

3. Results

Descriptives

Regarding profession, the participants were physicians (40.3%), nutritionists (9.2%), nurses (8.5%), dentists (8.2%), psychologists (6.6%), kinesiologists (5.9%), biochemists (3.6%), and others (17.7%). Regarding years of experience, 42% (n=128) reported having worked for 16 years or more, 13.8% had worked for 11 to 15 years, 19.3% had worked for 6 to 10 years, and 24.9% had worked for 5 years or less. Regarding the use of devices and/or virtual teaching, 30.8% of teachers reported never having used these resources, 43.9% mentioned sporadic use, 23% stated that they only used them for homework, practical work, or assessments, and finally, 2.3% used these tools in all their classes.

Translation and adaptation

Based on the reviews by the translators and expert judges, some items were modified, for example, using expressions more akin to Argentine culture and updating applications (see item 5: "WhatsApp" instead of "Messenger"). Also, since item 2 was the only one phrased negatively ("M-learning applications do not generate affective learning-teaching environments"), it was reworded positively to unify it with the others. The scale items in their original English version (18) and the final Spanish version, resulting from the translation and cross-cultural adaptation stages, can be seen in Table 1.

Table 1. Original version of the MLPS and the version translated and adapted to Spanish .

Original items (Uzunboylu & Ozdamli)	Spanish version
1. M-learning tools remove the limitation of time and space.	1. *Mobile learning* enables learning anytime, anywhere.
2. M-learning applications do not generate affective learning-teaching environments .	*Mobile learning* strategies facilitate the development of effective teaching environments.
3. Teaching–Learning process should be performed any with M-learning technologies.	3. The teaching process should be carried out with the inclusion of *mobile learning*.
4. I can use M-learning applications as a good discussion tool with my students in the learning activities.	4. I can use *mobile learning* as a good sharing tool with my students in learning activities.
5. Programs such as Messenger and Skype which are used through M-learning tools, provide opportunity for discussions on subjects without the limitation of time and space.	5. Programs such as WhatsApp, Instagram, *Facebook* , Twitter or other computer programs, They provide the opportunity to exchange ideas on a topic anytime, anywhere.
6. M-learning applications can be used to	6. *Mobile learning* can be used to complement

supplement the traditional education.	traditional education.
7. Learning activities can be realized by means of M-learning applications in e-learning.	7. Teaching activities could be carried out through *mobile learning* in virtual training .
8. An effective learning environment could be produced by sending lecture notes via M-learning tools such as e-mail.	8. The learning environment could be facilitated by sending class notes through *mobile learning tools* .
9. M-learning applications facilitate teaching the subjects in my Branch.	*Mobile learning* strategies facilitate the teaching of subjects in my discipline.
10. M-learning applications is a good method in learning my specialized subject.	10. *Mobile learning is* a good method to learn the subject of my discipline.
11. M-learning technologies is an effective method in exact transmission of knowledge in learning activities.	11. *Mobile learning is* an effective method for the correct transmission of knowledge in teaching activities.
12. Teacher-student communication is facilitated by means of M-learning tools.	12. *Mobile learning facilitates* communication between teachers and students.
13. Utilization of -learning technologies increases students' motivation.	13. The use of *mobile learning* increases student motivation.
14. I can have a prompt access to materials that I need which is related to my branch by means of mobile technologies.	14. Through *mobile learning* I can quickly access the material I need for my subject.
15. M-learning applications are reliable for personal use.	15. Mobile technologies are reliable for personal use.
16. Communication is possible in chat programs by means of mobile technologies.	16. It is possible to communicate adequately using chat programs.
17. M-learning applications is a good method for the interaction, which is necessary in my class.	17. *Mobile learning* is a good method to achieve the necessary interaction in my class.
18. M-learning applications are convenient to share my specialized knowledge with my colleagues.	18. *Mobile learning* is convenient for sharing knowledge with colleagues.
19. Course materials could be sent to students via MMS messages.	19. Study material could be sent to students via multimedia messages, for example, texts, videos or images.
20. M-learning systems increase the quality of lessons.	20. *Mobile learning* could improve the quality of classes.
21. I would like to supplement my classes in future with M-learning method.	21. In the future, I would like to complement my classes with *mobile learning tools.*
22. Student-student communication is facilitated by means of M-learning tools.	22. *Mobile learning* can facilitate communication between students.
23. M-learning technologies can be used as a supplement in all classes on all subjects.	23. *Mobile learning* can be used to complement classes in all subjects.
24. M-learning applications provides a convenient environment to do discussions on my specialized subject.	24. *Mobile learning* provides a suitable environment for conducting academic exchanges in my subject.
25. Learners can access the instructional websites	25. Students can access educational websites through

with mobile technologies.	*mobile learning.*
26. Students can have more effective communication with mobile technologies than traditional methods.	26. Students could achieve more effective communication with *mobile learning* than through traditional methods.

Study of the scale

The values obtained for the fit indices of the tested models, as well as the Akaike index (AIC), can be seen in Table 2. Compared with the 3-factor model, the unifactorial model and the short version presented satisfactory fit indices and an acceptable error, and it can be stated that both fit similarly, with the AIC index being lower for the short version of the scale. Table 3 shows the R2 values and factor loadings for the 26-item unidimensional model and for the items retained in the short version.

Table 2. Fit indices for the three MLPS **models** .

	X^2/gl	NFI	NNFI	CFI	IFI	GFI	RMSEA	AIC
Three factors	7.54***	.69	.70	.72	.72	.70	.15	18035.102
Unifactorial	3.09***	.88	.90	.91	.91	.79	.08	16702.835
Short version of the single-factor test	3.01***	.97	.97	.98	.98	.93	.08	6021.961

*** $p < .001$.

Table 3. Factor structure of the MLPS and its short version

	MLPS Scale		Brief MLPS Scale	
	R^2	Estimated standardized	R^2	Estimated standardized
Item 1	.504	.710		
Item 2	.490	.700		
Item 3	.502	.708		
Item 4	.629	.793		
Item 5	.574	.758		
Item 6	.624	.790		
Item 7	.481	.694		
Item 8	.678	.823	.677	.823
Item 9	.704	.839	.655	.809
Item 10	.584	.764		
Item 11	.583	.764		
Item 12	.612	.782		
Item 13	.539	.734		
Item 14	.687	.829	.688	.830
Item 15	.497	.705		

Item 16	.505	.711		
Item 17	.545	.738		
Item 18	.696	.834	.715	.846
Item 19	.743	.862	.795	.892
Item 20	.750	.866	.756	.869
Item 21	.756	.869	.775	.881
Item 22	.675	.822	.676	.822
Item 23	.546	.739		
Item 24	.676	.822	.659	.812
Item 25	.721	.849	.755	.869
Item 26	.444	.666		

Reliability, assessed through internal consistency, yielded a value of α=.96 for the 10-item set. Meanwhile, the study of the Average Variance Extracted (AVE) for the short version yielded a satisfactory value of AVE=0.96. Figure 1 shows the factor loadings and measurement errors for the Short Version of the ML Perception Scale .

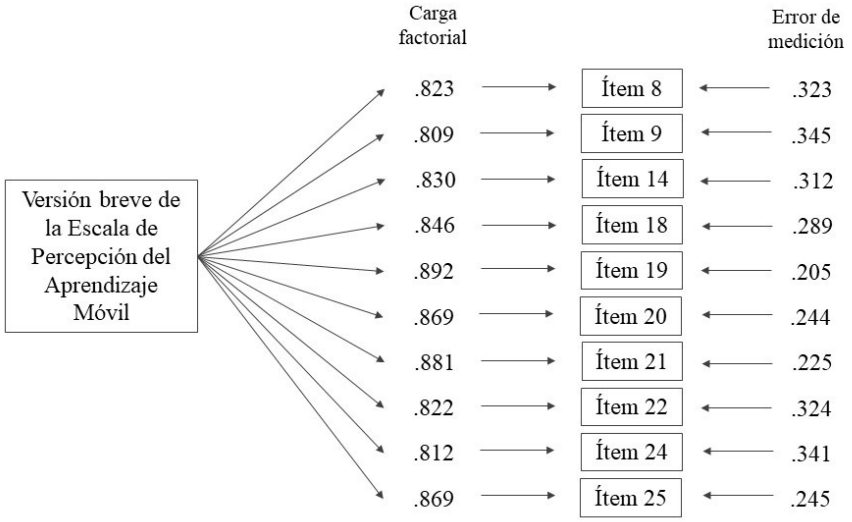

Figure 1. Factorial structure of the MLPS Short Form

Study of the items

The skewness and kurtosis values with their corresponding standard errors for the 10 items of the short version of the scale are shown in Table 4, and it can be observed that most are around the recommended values of ± 1.5 (Forero et al., 2009). To study the discriminatory capacity of the items, corrected homogeneity indices (CHI) were calculated, obtaining satisfactory values in all cases (≥ .30) (30).

Perception of Mobile Learning in the sample.

The average score for the AM Perception variable for the total sample of 305 teachers, taking into account the short 10-item version, was M=3.94; SD=0.89, remembering that the response scale ranges from 1 to 5.

Table 4. Descriptive statistics of the items of the short version of the ML Perception Scale.

	M	**OF**	**Asymmetry**		**Kurtosis**		**IHC**
			Statistical	**Error**	**Statistical**	**Error**	
8. The learning environment could be facilitated by sending class notes through *mobile learning tools* .	4.01	1.02	-1.50	.14	2.26	.28	.81
9. *Mobile learning* strategies facilitate the teaching of subjects in my discipline.	3.74	1.02	-.98	.14	.92	.28	.80
14. Through *mobile learning* I can quickly access the material I need for my subject.	4.08	1.06	-1.51	.14	2.09	.28	.82
18. *Mobile learning* is convenient for sharing knowledge with colleagues.	3.95	1.00	-1.43	.14	2.19	.28	.83
19. Study material could be sent to students via multimedia messages, for example, texts, videos or images.	4.15	1.04	-1.64	.14	2.57	.28	.88
20. *Mobile learning* could improve the quality of classes.	3.86	1.04	-.99	.14	.71	.28	.85
21. In the future, I would like to complement my classes with *mobile learning tools.*	3.96	1.11	-1.25	.14	1.10	.28	.86
22. *Mobile learning* can facilitate communication between students.	3.95	1.06	-1.31	.14	1.48	.28	.81
24. *Mobile learning* provides a suitable environment for conducting academic exchanges in my subject.	3.67	1.02	-.79	.14	.27	.28	.80
25. Students can access educational websites through *mobile learning* .	4.08	1.00	-1.63	.14	2.81	.28	.85

4. Discussion

The wording of the 26 items of the MLPS was adjusted through several stages of translation, back-translation, and linguistic adaptation, according to the 5-stage method proposed by Arribas (21). Each stage was necessary for the items to convey the same idea as the version proposed by the original authors (18), while prioritizing cultural adaptation over literality. Specifically, throughout the entire process of translation, adaptation, and harmonization of the 26 items, the wording of 16 items was modified.

The short version of the scale, composed of 10 items, presented better fit indices compared to the other two models. Although the data fit a unidimensional structure, the three original factors are represented in the final version. It is possible to recognize that the items that initially corresponded to different dimensions in the Turkish authors' version were found to be quite similar to each other by the teachers who responded to the instrument. The fact that a single factor was found to underlie the set of items allows us to infer that, although the instrument operationalizes different components of ML Perception , these aspects would have a high correlation with each other, as evidenced by the high values obtained in the fit indices of the unidimensional model.

Considering the convenience of a shorter version for our setting, it was decided to create a tool with fewer items than the original. This was also a recommendation from the committee of experts and from the pilot test, which indicated that they found the task of answering the 26-item scale extensive and tiring, in line with the results reported by Italian researchers (15). The items with the best psychometric performance were retained, hoping that the shorter version of the instrument can be used in research contexts or other areas that require it.

The proposed short version presented a better psychometric fit, being preferable to the longer version, making it easier to administer. Furthermore, the text of the 10 items that were retained reflects the theoretical definition proposed by the authors who developed the construct. For example, two of the items correspond to the first of the original dimensions (items 8 and 20). Similarly, five items were found to correspond to the second dimension (items 9, 14, 18, 21, and 24). Finally, three items corresponding to the third dimension appear in the short version (items 19, 22, and 25).

Regarding reliability, the score obtained demonstrated satisfactory internal consistency for the 10-item set. The fact that all items were highly correlated with each other also supports the test's unidimensional structure. When studying the functioning of the items in the short version of the scale, it was found that they all displayed good discriminatory capacity, meaning that the items were able to differentiate between teachers who had a very positive perception of ML and those who had a less positive perception of this attribute.

In the total group of participants, the average obtained in terms of AM Perception was, on a scale of 1 to 5, above the average, close to 4. This would indicate that the people who responded to the questionnaire have a positive attitude towards technological tools, accepting them as valid resources to use in their teaching practice. In accordance with this, Sanchez Lupiañez (31) saw a general positive attitude on the part of teachers towards ML. Similar results were reported by Cavus et al. (2), who found that a group of teachers showed a high positive perception of AM, which could respond to the increase in training on the subject. In this sense, Akkaya et al. (4) mentioned that teachers in their last years of training showed more acceptance to learn about the use of applications that contain more components or functionalities to increase student motivation.

It is important to note that the positive perception expressed by the teachers evaluated in this study is due to the fact that the scale aims to measure what they think about this tool, and not the frequency with which it is used in practice. Many of the items on the scale aim to assess professionals' desire to

include mobile technologies in their classes, rather than their actual or current use. Examples of this are item 20: "Mobile learning could improve the quality of classes" and 21: "In the future, I would like to supplement my classes with mobile learning tools." Likewise, some items express beliefs, but not the specific use of mobile learning strategies, as is the case with item 9: "Mobile learning strategies facilitate the teaching of subjects in my discipline." Furthermore, it can be seen that item 24: "Mobile learning provides a suitable environment for academic exchanges in my subject" expresses a positive assessment.

Regarding the report on utilization, it was found that only 2.3% reported using these tools in all their classes and that 30.8% never used this type of resource. These results are inconsistent with the average observed in the ML Perception variable, which indicates that, although they expressed being in favor of using technological tools for teaching their classes, very few manage to implement it concretely. The percentages indicate that 75% of the sample does not regularly use technology, but still consider it to be a valuable resource that would enhance learning. Therefore, it is important for teachers to maintain a positive perception of Information and Communication Technologies, which could promote the incorporation of mobile devices in the teaching-learning process (31).

However, the results must be interpreted with some limitations in mind. Participation was voluntary, which could have generated a self-selection bias toward teachers with greater interest or affinity for Mobile Learning, and the self-report questionnaire may have introduced social desirability biases. Furthermore, the application of non-probability purposive sampling does not guarantee representativeness of different provinces, for example, which restricts the generalizability of the results. Finally, the predominantly online format of data collection could have favored the participation of teachers with greater technological familiarity, potentially excluding those who do not frequently use digital tools.

Despite these limitations, the short version of the scale developed constitutes a significant contribution to educational research, offering a culturally adapted and easy-to-use instrument. Its improved psychometric fit and unidimensional structure support its use as a valid and efficient tool for assessing university professors' perceptions of MA .

Future research should explore the scale's external validity by applying it alongside other instruments that measure related or contrasting constructs, as well as expanding the sample to different institutional contexts and regions of the country to strengthen the generalizability of the results. Furthermore, it would be valuable to complement the assessment of teacher perceptions with measurements that explore the actual implementation of mobile technologies in teaching, in order to analyze the consistency between stated attitudes and effective practices. Although the validation was conducted with teachers from different Health Sciences programs, the construct evaluated is potentially applicable to other biomedical and educational areas. Future studies could expand their analysis to different disciplines to confirm the model's stability and cross-cultural validity.

5. Conclusions

- Based on the translation, cultural adaptation, and psychometric study, we have a valid, reliable, and culturally relevant instrument for assessing university instructors' perceptions of mobile learning . The short version of the scale demonstrated superior psychometric fit, resulting in a practical and accurate tool that can be used in research contexts or for educational purposes. This scale will allow for diagnosing instructor perceptions and evaluating interventions aimed at integrating mobile learning into higher education.
- The general perception of university professors in Health Sciences programs regarding mobile technology was positive, as evidenced by the high average score obtained for this variable. This suggests that professors are willing to use mobile technology tools in their classes. However, the majority of professors stated that they do not use these technological resources in their

classes. Because there is a high correlation between attitudes toward mobile technology and preparation, a positive correlation was also found between preparation and satisfaction. Therefore, it is essential to encourage and train professors in the use of mobile technologies to reduce the gap between reported attitudes and actual implementation.

- Evidence was provided to confirm that the perception of AM does not differ by gender or age. This would facilitate interventions aimed at developing equal training for men and women, as well as for younger and more senior teachers, knowing that all have a similar acceptance of AM.

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