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Translation and Validation of the Online Homework Distraction Scale for Peruvian University Students

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The objective of this study was to translate and validate the Online Homework Distraction Scale (OHDS) for Peruvian university students. Accordingly, an instrumental cross-sectional study was conducted with 811 university students, including students of both sexes aged between 16 and 39 (M = 20.96 years; SD = 4.42) residing in the city of Lima. The content-based validity evidence was analyzed using Aiken's V coefficient based on the internal structure through a confirmatory factor analysis and considered in relation to other variables a through correlation analysis. The reliability was calculated using the Omega coefficient. Expert opinions were favorable for all items ($V > 0.70$). The one-dimensional structure of the scale was confirmed, and it presented acceptable reliability ($\alpha > 0.70$). Thus, the OHDS for university students is a measure with a valid and reliable scale.

Keywords: translation, validation, distractors, university students, Peru

INTRODUCTION

In mid-March 2020, the impact of the COVID-19 pandemic forced most governments in the world to order the closure of educational institutions to prevent the proliferation of the virus from Wuhan (Hermann et al., 2021). Owing to this reality and with the date of returning to in-person classes remaining uncertain, both schools and universities found that continuing and completing study programs online was the only alternative (Muthuprasad et al., 2021).

In this new scenario, students had to face various challenges to take advantage of and manage their online learning process. One such challenge involved controlling online learning distractors, which had a greater impact at the university level (Schmidt, 2020). Distractors are defined as any stimulus that generates a shift in focus from study tasks or activities that are clearly related to learning to other activities or situations (Feng et al., 2019).

In relation to this phenomenon, the scientific literature provides a frame of reference to understand how the brain works when it comes to exercising control over attention, a cognitive function key in learning and carrying out online tasks. In this case, the theoretical model of dual attention processes shows that our attention capacities are limited (Corbetta and Shulman, 2002) because even though the brain focuses on an objective activity, its attention can get diverted to other focal points owing to internal or external stimuli. Therefore, trying to distribute attention between different activities can hinder and interfere with student learning and performance (Xu et al., 2020). Thus, the theories of divided attention and dual-task interference (Garcia, 1991) posit that when a

student tries to focus on virtual classes and navigate social networks simultaneously, an interference can occur, impeding speed and accuracy in the learning process. This interference occurs because the capacity of the brain's attentional division index, responsible for controlling the distribution of attentional resources dedicated to tasks and cognitive operations, is exceeded (Baddeley, 1996).

In this regard, it is important to differentiate between the types of distractors. Traditionally, researchers have discussed internal distractors (personal and family problems as well as psychological manifestations such as anxiety, demotivation, and fatigue) and external distractors (noise, lighting, and temperature) (Aagaard, 2015). However, with the development and inclusion of technologies in learning, a new taxonomy currently predominates, classifying distractors as conventional and unconventional (Xu, 2015). In this case, the conventional ones are stimuli that traditionally displaced the student's attention in the time and learning context (noise, environmental factors, and personal and family problems, among others). Conversely, unconventional stimuli are more related to the use of new technologies (smartphones, social networks, the internet, and network games, among others) (Xu et al., 2016).

Currently, the research emphasizes that unconventional distractors have become more important in the context of virtual learning (Kolhar et al., 2021). The most common involve the use of music players, mobile devices, internet use, and social networks such as Facebook (Feng et al., 2019). These facts have been demonstrated even before the pandemic, as, for example, in the study conducted by Calderwood et al. (2014), who reported that university students who participated in a 3-h independent study session, on average, spent 73 min listening to music while studying. In addition, 35 distractions were noted during the course of the 3 h.

Based on this, serious reflection is necessary; although technology has resulted in great advances for the improvement of educational quality, its misuse has also affected university education. This is why many researchers claim that the role played by self-regulation (Hatlevik and Bjarnø, 2021) in virtual learning contexts (Berridi and Martínez, 2017), such as the one we are currently experiencing, is preponderant.

According to Magalhães et al. (2020), changes in traditional education have apparently led to a different way of performing and delivering academic assignments. Thus, the level of learning in a virtual context highly depends on the disposition and interest of the university students themselves, who are known to complete several activities simultaneously. This is a phenomenon widely documented through studies that describe how multitasking linked to the use of mobile phones makes learning difficult (Chen and Yan, 2016).

For this reason, unconventional means of distraction such as the problematic use of smartphones (Yang et al., 2019; Akinci, 2021), social networks (Ramos-Galarza et al., 2017; Hejab and Shaibani, 2020), and the internet (Aznar-Díaz et al., 2020) tend to have a more significant negative impact on academic performance (Gupta and Irwin, 2016). One of the most significant consequences of such distractors at the academic level is dilatory behavior, better known as academic procrastination, which involves postponing essential academic activities (Steel et al., 2018) despite being aware of the consequences. In this regard, studies affirm that the problematic use of cell phones stems from procrastination (Hong et al., 2021). They add that the prevalence of such behavior is increasing as a result of the presence of technological stimuli (video games, television, the Internet, videos, social networks, etc.) (Madhan et al., 2012), which are inevitably integral aspects of students' daily lives.

Following this reasoning, a student's vulnerability to online distractors and their repercussions can lead to a sense of dissatisfaction among students in terms of their university experiences. Such dissatisfaction is particularly experienced by students toward the end of the degree when they undertake self-assessments and believe that their academic, social, and emotional performance (Alvarez et al., 2015) levels could have been higher. At this stage, they realize that excessive use of digital avenues such as social networks for non-academic purposes has gradually affected their academic performance, social interactions, and lifestyle (Kolhar et al., 2021).

A theoretical perspective aimed at clarifying the relationship between online homework distractors, academic procrastination, and satisfaction with studies can be obtained by means of evaluating the findings of relevant researches. For example, Svartdal et al. (2020) found that distractions in the university setting contribute to procrastination. This finding was confirmed in the study by Steel et al. (2018); in this study, procrastinators scored higher on distraction scales. In fact, it has been typically inferred that students already susceptible to procrastination are significantly impacted by environments entailing many distractors, particularly the unconventional ones, which divert planned behavior and drive individuals toward more pleasurable activities Svartdal et al. (2020). Such distractions can lead students to making extreme decisions such as dropping out; however, those who manage to make progress in their courses usually feel a certain level of dissatisfaction with their studies at the end of each academic period (Cieza et al., 2018).

Consequently, having recognized the importance of investigating distractors during the performance of online tasks, there is an urgent need for measurement instruments that allow researchers to evaluate the incidence of this phenomenon in the Peruvian university population. However, a review of the available scientific literature reveals that there are still no valid and reliable measures for this context despite the latent need to conduct research on the effect of certain distractors on academic performance (Durán-Aponte and Pujol, 2013; Ramos-Galarza et al., 2017; Mendoza, 2018; Guillén, 2019).

Given this gap in the literature, the researchers of the present study found it appropriate to examine a short and adaptable version within the Peruvian university population, given the current context in which studies cannot be carried out in person but must utilize virtual resources owing to the social restrictions imposed by the government at this time. In addition, the alternative of constructing an instrument was ruled out because constructing a measure under the international standards for educational and psychological tests

(American Educational Research Association, American Psychological Association, and National Council on Measurement in Educationin, 2014) requires resources and a lengthy schedule to implement, issues that are not in accordance with the resources that are presently available to the authors of this article.

Thus, one measure that addresses the aforementioned needs is the Online Homework Distraction Scale (OHDS), which, from its first version, takes into account conventional and unconventional distractors for the teacher population (Xu et al., 2016). Recently, however, Xu et al. (2020) re-examined its psychometric properties in the Chinese university student population, a group that is similar to the one that is intended to be studied herein.

Because of the need to evaluate online homework distractors in the context of online education in the context of COVID-19 (Aguilera-Hermida, 2020), the present study aims to translate and validate the OHDS for Peruvian university students. In addition, owing to the relationship of online task distractors with study satisfaction and procrastination (Balkis and Duru, 2016, 2017), the latter two variables are proposed as a contrast for convergent validity analysis.

METHODOLOGY

Design and Participants

It is an instrumental study with an observational and transversal design (Ato et al., 2013). Under an intentional non-probabilistic sampling, 811 undergraduate university students participated voluntarily in this study, of which 295 were male, 511 were female, and 5 preferred to not specify their gender, with an average age of 20.96 years old (SD = 4.423). All undergraduate students were included regardless of their specific academic year, university, or educational institution.

Procedures

The current study was developed in two stages: the translation and the validation of the OHDS in Latin-American Spanish. Before starting, permission was obtained from the corresponding author of the original instrument *via* email. In addition, the study was reviewed by the Ethics Committee of Universidad Peruana Unión, and permission was obtained to begin with the corresponding procedure.

The translation process was performed based on the recommendations offered by Guillemin et al. (1993), with an initial translation by a group of translators, a back translation by other translators without knowledge of the original questionnaire, a review committee, and a focus group for pretesting.

Initial Translation

The process began with the translation of the original instrument into Spanish; four translators to whom the authors had access were requested to participate. The translators were bilingual with an advanced level of English. The four translators were invited to participate to compare and assess the various translations in terms of the clarity of the criteria and to make any necessary adjustments to grammar.

Back Translation

Once an appropriate translation was discussed and chosen for each item, the scale was sent to three English translators with a university degree who had also been invited to participate in the study. All three translators spoke English and Spanish fluently. Each translator prepared an independent translation of the scale from Spanish to English. Subsequently, the researchers held a virtual meeting in which they reviewed the translation of the scale and prepared a consolidated version, taking the suggestions into consideration and incorporating the corresponding modifications.

Focus Group

A call was made for university students in Metropolitan Lima, and the meeting took place virtually. The main criterion for this activity was for the participants to be enrolled in a professional degree program. In total, 29 students from different programs and universities responded to the call (14 men and 15 women). These students were presented with the items translated into Spanish and invited to comment on them or indicate whether the meaning of the items was clear and if the vocabulary used was understandable. Their comments and suggestions were recorded and considered by the researchers to assess the relevance of the final translation.

The focus group suggested the following change: *Mi mente se dispersa* or *Mi pensamiento divaga* instead of *Sueño despierto* in Item 1.

Questionnaire Validation

The validation of the scale comprised an expert review. To this end, six psychologists who were experienced in the educational field and university teaching (three of them held a master's degree and the other three a doctorate) participated. In their review, the psychologists analyzed the content validity through the relevance, representativeness, and clarity of the items; the Aiken V value was calculated for each item. **Table 1** shows the original version of the OHDS scale and the translated Peruvian version (distraction scale when performing tasks online).

Following the translation and validation of the scale by experts, an online form was designed in Google Forms wherein the informed consent, a sociodemographic record, and the statements of the scale were included. The first section of the form stated the research objective, that participation was anonymous and voluntary, and that the information collected was for research purposes only.

To measure the EPA variable, the Academic Procrastination Scale was used, validated in the Peruvian context by Dominguez-Lara et al. (2014). This instrument has 12 items distributed in two dimensions: academic self-regulation and the delay of activities. The EPA has proven to be valid (CFI = 1.00, GFI = 0.97, RMSA = 0.078) and reliable ($\alpha = 0.81$).

In addition, ESE was measured with the Brief Study Satisfaction Scale, validated by Merino-Soto et al. (2017) in

TABLE 1 | Original instrument in English and the Spanish translation.

No.	Items from the original English version	Translation of the items in the Peruvian version
1	I daydream while doing online assignments.	Mi mente se dispersa mientras realizo tareas en línea.
2	I start conversations unrelated to what I am doing.	Inicio conversaciones que no guardan relación con las tareas que estoy haciendo.
3	I stop online assignments to watch my favorite TV show.	Dejo de hacer las tareas en línea para ver mi programa de televisión favorito.
4	I stop online assignments to play video games.	Dejo de realizar las tareas en línea para jugar videojuegos.
5	I stop online assignments to send or receive email.	Interrumpo las tareas en línea para enviar o recibir correos electrónicos.
6	I stop online assignments to send or receive text messages.	Interrumpo las tareas en línea para enviar o recibir mensajes de texto.

TABLE 2 | Aiken's V to assess the relevance, representativeness, and clarity of the items in the distraction scale when performing online tasks scale.

Items	Relevance ($n = 6$)				Representativeness ($n = 6$)				Clarity ($n = 6$)			
	M	SD	V	CI 95%	M	SD	V	CI 95%	M	SD	V	CI 95%
Item 1	3.00	0.00	1.00	0.89–1.00	3.00	0.00	1.00	0.89–1.00	2.33	0.82	0.78	0.60–0.89
Item 2	2.83	0.41	0.94	0.80–0.99	2.83	0.41	0.94	0.80–0.99	2.17	0.75	0.72	0.54–0.85
Item 3	2.50	0.84	0.83	0.66–0.93	2.50	0.84	0.83	0.66–0.93	2.50	0.84	0.83	0.66–0.93
Item 4	2.33	1.03	0.78	0.60–0.89	2.33	1.03	0.78	0.60–0.89	2.67	0.82	0.89	0.73–0.96
Item 5	3.00	0.00	1.00	0.89–1.00	3.00	0.00	1.00	0.89–1.00	3.00	0.00	1.00	0.89–1.00
Item 6	2.83	0.41	0.94	0.80–0.99	3.00	0.00	1.00	0.89–1.00	3.00	0.00	1.00	0.89–1.00

Peruvian university students. This instrument is composed of three items and has been reported to be valid (CFI = 0.92, GFI = 0.99, RMSR = 0.053) and reliable ($\alpha = 0.788$).

Ethical Considerations

This study was approved by the Research Ethics Committee of Universidad Peruana Unión with the approval number 2021-CEUPeU-0038.

Statistical Analysis

First, the analysis was carried out through expert opinions and based on the scores assigned to the items, Aiken's V coefficient (with significant values ≥ 0.70), and its 95% confidence intervals (CI; Ventura-León, 2019). Through this procedure, the judges' opinions were quantified based on the analysis of the representativeness, relevance, and clarity of the test's contents (Ventura-León, 2019). Second, the descriptive statistics of the OHDS' items (mean, standard deviation, skewness, and kurtosis) were calculated. Finally, a confirmatory factor analysis (CFA) was performed, considering the ordinal nature of the items, and the diagonally weighted least squares with mean and variance robust estimation was corrected. Here, the goodness-of-fit of the model was determined through the comparative fit index (CFI) and the Tucker–Lewis index (TLI). In addition, the parameters for the root mean square error of approximation (RMSEA), root mean square residual, and standardized root mean square residual (SRMR) were used, all of these falling under the criteria suggested by Keith (2019).

As an indication of a good fit, CFI and TLI > 0.90 (Hu and Bentler, 1999) and RMSEA and SRMR < 0.080 (Keith, 2019) were considered. In the third stage, validity based on other variables was analyzed (procrastination and satisfaction with studies), and Pearson's correlation coefficient was used.

TABLE 3 | Descriptive statistics of the OHDS scale.

Item	M	SD	As	K
Item 1	3.297	0.877	−0.132	0.184
Item 2	2.951	0.965	0.000	−0.234
Item 3	2.237	1.037	0.504	−0.327
Item 4	1.777	1.014	1.089	0.238
Item 5	2.247	0.963	0.319	−0.580
Item 6	3.095	1.094	−0.121	−0.500

M, mean; SD, standard deviation; As, coefficient of skewness; K, coefficient of kurtosis.

Finally, reliability was calculated through Cronbach's alpha coefficient and their respective CI (Domínguez-Lara and Merino-Soto, 2015). Thus, the goodness-of-fit measures followed the recommendations by Hu and Bentler (1999).

For the analyses, the statistical program FACTOR Analysis, version 10.9.02 (Lorenzo-Seva and Ferrando, 2007), was used to analyze the descriptive statistics. Further, for the CFA, the Rstudio program (version 4.0.2) and lavaan package were used; to calculate the reliability, the statistical software SPSS, version 26.0, was used.

RESULTS

Validity Based on the Content

Table 2 shows the results of the assessment of six experts who analyzed the relevance, representativeness, and clarity of the items on the OHDS scale. The results indicate that all the items received a favorable assessment ($V > 0.70$) (**Table 2**). In particular, it was observed that Items 1 and 5 were more important than the others ($V = 1.00$; CI 95:

TABLE 4 | Fit indices of the models evaluated by the study instrument's CFA.

Model	χ^2	df	CFI	TLI	RMSEA Value	RMSEA CI [90%]	SRMR	WRMR
6 items	77.614	9	0.960	0.934	0.097	[0.078, 0.117]	0.047	1.109
5 items	29.100	5	0.984	0.968	0.077	[0.051, 0.105]	0.036	0.752

df, Degree of freedom; CFI, Comparative fit index; TLI, Tucker–Lewis index; RMSEA, Root mean square error of approximation; CI, Confidence interval.

TABLE 5 | Correlation between OHDS and two external variables.

Variable	M	DS	1	2
1. OHDS	13.36	3.43		
2. EPA	27.92	7.38	0.583**	
3. ESE	10.11	2.57	−0.383**	−0.541**

M, mean; DS, standard deviation; ** indicates $p < 0.01$; OHDS, Online Homework Distraction Scale; EPA, Academic procrastination; ESE, Satisfaction with studies.

0.89 to 1.00). Items 1, 5, and 6 were the most representative ($V = 1.00$; CI 95: 0.89 to 1.00); Items 5 and 6 were the clearest ($V = 1.00$; CI 95: 0.89 to 1.00) In addition, all the values of the lower limit of the 95% CI were appropriate, and all the values of the V coefficient were statistically significant. Thus, the OHDS reported evidence of content-based validity.

Preliminary Analysis of the Items

Table 3 presents the descriptive statistics (mean, standard deviation, skewness, and kurtosis) of the OHDS. Item 1 has the highest average score ($M = 3.29$), and Item 6 reports the highest dispersion (DS = 1.09). The asymmetry and kurtosis values of the scale items are not higher than ± 1.5 (Peréz and Medrano, 2010).

Confirmatory Factor Analysis

To verify the validity based on the internal structure of the OHDS, a CFA was executed (**Table 4**). The results of the original model did not present adequate fit indices. Therefore, through the index modification technique, Item 5 was eliminated, obtaining a satisfactory factor structure model ($\chi^2 = 29,100$, df = 5, $p < 0.001$; CFI = 0.984; TLI = 0.968; RMSEA = 0.077 and SRMR < 0.05).

Validity Based on the Relationship With Other Variables

Regarding the relationship of the OHDS with other variables, the OHDS relates in a direct and statistically significant way to Academic procrastination (EPA) ($r = 0.583$, $p < 0.01$) and in an inverse and statistically significant way to Satisfaction with studies (ESE) ($r = −0.383$, $p < 0.01$). In addition, both present a small and medium effect size, respectively. The findings show evidence of validity (**Table 5**).

Reliability

The internal consistency of the instrument was calculated using Cronbach's alpha coefficient ($\alpha = 0.72$; 95% CI:0.68–0.75), revealing that the scale scores were reliable and consistent with each other.

DISCUSSION

Given the current relevance of measuring distractions in the development of academic tasks in virtual teaching environments, the aim of the present study was to translate and validate the OHDS for Peruvian university students. Currently, there are few such studies in the national Latin-American context; therefore, pertinent and precise measurement instruments that have evidence validity constitute a necessary contribution.

Per the research objective herein, the results of the analysis procedures allow us to corroborate that the translated version of the OHDS shows evidence of validity based on the content, an adequate internal structure, evidence of validity based on the relationship with other variables, and internal consistency. The psychometric properties found herein are similar to those reported in the study of the original version of the instrument conducted with Chinese university students (Xu et al., 2020).

In terms of content-based validity, using the expert opinion technique, it was confirmed that the OHDS items, as translated into Latin-American Spanish, are representative, relevant, and clear; evidence was given on the adequate linguistic fit and psychological equivalence of the construct of interest. Therefore, the translated version of the OHDS constitutes a relevant instrument for the Peruvian context.

Regarding the validity based on the internal structure, a one-dimensional structure was verified with adequate fit indices based on a CFA. These findings are analogous to those reported in previous studies (Xu et al., 2020), providing evidence in support of technology-related and conventional distractions being empirically indistinguishable in the sample of Peruvian university students. However, in the current study, the model that achieved a better fit was produced by eliminating Item 5 ("I interrupt my online tasks to send or receive emails"), which could respond to cultural differences that affect how to characterize distracting stimuli related to the task of the participants of this study in contrast with the experience of Chinese students. Accordingly, considering the Peruvian context and the generational characteristics of the university students that participated in this study, sending or receiving emails is not a common practice that represents an important distracting stimulus because young Peruvians prefer instant messaging through social networks more than more traditional services such as email (Guillén, 2019).

In relation to the evidence of the validity in relation to other variables, OHDS is directly and statistically significant in relation to EPA, a procrastination measure, and inversely and statistically significant toward ESE, which measures satisfaction with studies. The relationships found herein are consistent with the findings of

previous studies, which were mainly conducted with university students, analyzing the predictive power or the strength of the association of variables related to the use of ICTs, which can be considered sources of distraction and academic procrastination. Among these variables are the problematic use of smartphones (Yang et al., 2019; Akinci, 2021) as well as the use of or addiction to social media (Ramos-Galarza et al., 2017; Hejab and Shaibani, 2020) and the internet (Aznar-Díaz et al., 2020).

Finally, regarding the reliability of the instrument, adopting the perspective of internal consistency, OHDS becomes a reliable and precise measure, obtaining results similar to those reported by Xu et al. (2020).

Regarding the limitations of the research, the most important one is related to the characteristics of the intentional sampling. Therefore, future studies should consider using representative samples through a probabilistic sampling that accounts for different cultural contexts. In addition, the data collection herein considered only the use of self-reporting measures, so the responses of the subjects might not accurately reflect their behaviors with respect to the variables that were evaluated. Given these limitations, the pending agenda in future research is related to the need to consider intercultural environments since cultural differences may influence how students' distractors manifest during the performance of academic activities in virtual learning environments, considering the ethnic diversity present in Peruvian universities, can be demonstrated through the cultural and linguistic plurality of the different indigenous and Amazonian communities. Furthermore, future research should investigate related contextual factors, including the area of training, self-regulation strategies, and a motivational classroom climate, such that clear and understandable indicators can be acquired for intervention in educational contexts. Moreover, it will be necessary for future instrumental studies to explore the invariance of the measure with respect to sociodemographic variables of interest, such as the sex or education level of the students. Lastly, the development of longitudinal research would be useful to assess the evolution of the relevance and representativeness of the items, considering the changes produced in the dynamics of social interaction by the use

of technology, which may determine the appearance of new distracting stimuli related to the task.

The evidence obtained herein allows us to conclude that the OHDS has demonstrated adequate psychometric properties (its validity based on the content, internal structure, and relationship with other variables) for Peruvian university students. Therefore, the scale represents an appropriate means to evaluate college students' distraction when performing online tasks and can be used for research, evaluation, and professional intervention purposes in the field of education. The implications of the present study, then, are that the findings of this study lies in the fact that the findings support the validity of the interpretations obtained with the OHDS for Peruvian university students which will lead to progress in describing, understanding, and explaining the phenomenon of task distraction in online learning environments in this population.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

AUTHOR CONTRIBUTIONS

RC and OM-B conceived and designed the experiments, performed the experiments, analyzed and interpreted the data, and wrote the manuscript. FS-A, AM-V, AP, and SL contributed reagents, materials, analysis tools, or data and wrote the manuscript. All authors contributed to the article and approved the submitted version.

SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/feduc.2022.793151/full#supplementary-material

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