



The Help-Seeking Scale for Online Learning Environment (HSOLE): Validity and Reliability

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Abstract

Help seeking is a critical psycho-educational structure that facilitates learning and ensures the potential and sustainability of online learning environments (OLE). This research aims to develop a scale for measuring help seeking behaviour in two contexts: (1) learning process help seeking and (2) assessment process help seeking. The motivation behind this research is to understand help seeking behaviours in OLE, which can potentially enhance these environments' effectiveness and learning outcomes. Help seeking involves learners recognizing difficulties and actively seeking assistance to overcome them, making their learning processes more efficient. The study group consists of 843 undergraduate students. The data collection tool was developed through three key processes: design, application, and validation. The design process begins with creating an item pool. The scale validity is tested through factorial validity, and its construct validity is measured based on convergent and discriminant validity. Reliability is tested using construct reliability and Cronbach's Alpha reliability coefficients. In conclusion, a valid and reliable measurement tool was developed with 58 items in total. This scale is an important tool for identifying help seeking tendencies in OLE. It contributes to the design of appropriate help systems to enhance the potential and sustainability of these environments. This research offers significant contributions to the literature on online learning and provides insights into strategies for making learning environments more effective.

Keywords Help seeking · Learning process help seeking · Assessment process help seeking · Scale development · Online learning environment

1 Introduction

Help seeking involves learners recognizing difficulties and proactively seeking assistance to overcome them, making their learning processes more efficient. Help seeking is a central psycho-educational structure that achieves the potential and sustainability of online learning environments (OLE) (Aleven et al., 2003). This research aims to develop a valid and reliable scale to measure help-seeking behaviours in OLE.

Extended author information available on the last page of the article

The research is motivated by three key factors. The first is driven by the lack of consensus in the relevant literature on the nature of help seeking and its sub-dimensions and how to assess them (Martín-Arbós et al., 2021). This lack of agreement undermines the validity and reliability of scholarly findings on help seeking. Various studies have used different components to consider help seeking as a construct. For example, some studies have only handled the dimension of avoidance of help seeking (Parnes et al., 2020). Therefore, future research should prioritize validating the psychometric properties of help seeking within diverse cultural contexts to facilitate the organization of scholarly discoveries, clarify and consolidate research outcomes, and establish a foundation for a comparable body of literature. The second motivation of this research is to analyze the nature of help seeking in the context of OLE. Terzi Müftüoğlu and Yurdugül (2024) reported differences between help seeking in OLE and other social contexts. This makes it necessary to develop a valid and reliable measurement tool to evaluate the nature of help seeking in OLE. Understanding these differences is crucial for accurately assessing and addressing help seeking behaviors in online environments (Aleven et al., 2016; Giblin & Stefaniak, 2021; Yang & Stefaniak, 2023). The third motivation is the efforts to conceptualize help seeking as a construct in the assessment process and the learning process. Notably, studies that assess help seeking literature mainly focus on help seeking the problem-solving process. Thus, further inquiry is needed to comprehend the nature of help seeking while learning a subject. The primary purpose of designing help seeking facilities in OLE is to help learners pass through critical points in the learning experiences. These key points are not only in the assessment but also in the learning process. In OLE, learners can interact with enriched content (e-books, infographics, videos, presentations, etc.) prepared specifically for a subject. Expecting learners to understand the entire content on their own would not be an acceptable expectation both in the social context and in the context of OLE, as favour autonomous learners (Li et al., 2023). Therefore, learners may need help in the assessment process and learning a subject/domain. However, it is seen that almost all of the studies focus on help seeking in the assessment process based on problem-solving (King et al., 2022; Wu & Nian, 2021). One reason for this is that modeling help seeking in the assessment process has a more feasible research base, i.e., there is a lack of research on how help seeking in the learning process is defined in OLE. This represents a significant gap in the literature, given the potential advantages and challenges of online help seeking. To this end, researchers have endeavoured to define help seeking in OLE's learning and assessment processes. A comprehensive understanding of help seeking in these processes is an exploratory step towards designing and implementing successful instructional strategies. Consequently, learners may need help in both the assessment and learning processes. Therefore, a comprehensive exploration of these factors is essential to advance our understanding and support of help seeking in OLE.

1.1 Theoretical Background

1.1.1 Help Seeking

Learners seek help when they monitor their learning process and become aware of the difficulties they face and cannot overcome independently (Newman, 1994). Zimmerman and Pons (1986) defined help seeking as a self-regulated learning (SRL) strategy as a “*learner-initiated*” effort to seek help from peers, teachers or other adults. Developmental psycholo-

gists view help seeking as a critical strategy for developing independent abilities and skills (Nelson-LeGall, 1981). In educational sciences, help seeking corresponds to a well-established area of research (Puustinen & Rouet, 2009).

Help seeking has been identified as a critical SRL strategy in learning environments (Alevén et al., 2003; Karabenick & Newman, 2006; Zimmerman & Martinez-Pons, 1990). SRL is especially important for online learners (Broadbent & Poon, 2015) because OLE favour autonomous learners (Artino & Jones, 2012). Hao et al. (2017) pointed out that the concept of online help seeking refers specifically to seek help through online tools such as search engines, e-mails or discussion forums in OLE. Cheng and Tsai (2011) defined three types of online help seeking behaviors: (1) help seeking online from human experts, (2) help seeking online from peers, and (3) searching online for relevant information through search engines. Hao et al. (2017) and Cheng and Tsai (2011) include a perspective that focuses on online help seeking behaviors. However, help seeking is defined as a metacognitive skill. It is a process that involves a series of actions, such as recognizing the need for help, identifying goals and problems, identifying potential helpers, and formulating questions to request help (Alevén et al., 2016). In this study, help seeking beyond a behavior was approached from the perspective of collaborative and social self-regulated learning strategy as a psycho-educational construct (Fong et al., 2023) and focused on the construct of help seeking in OLE, which is a more inclusive framework that includes online help seeking.

1.1.2 Interaction in Online Learning Environments

The learners' learning experiences within the system occur in different ways: learner-content, learner-learner, learner-instructor, and learner-assessment. Studies in the literature proved that individual characteristics, such as motivation sources, attitudes, cognitive styles, learning approaches, and so forth, affect learning. Another factor affecting learning is help seeking (Arroyo et al., 2004). Help seeking when one cannot solve a problem alone seems preferable to giving up or continuing to persist unsuccessfully alone (Newman, 1991). Help seeking is when students recognize a need for assistance and actively seek assistance from a source such as friends, instructors or support services (Karabenick & Newman, 2006). Help seeking encourages learning in the context of OLE (Alevén et al., 2003).

Learners who take responsibility for their learning in OLE are more successful (Hung et al., 2010), whereas others fail to benefit from these environments (Grow, 1991) fully. From this point, it is plausible to argue that students who do not take responsibility for their learning in OLE, or students lacking in this regard, need help or intervention. There is a risk that OLE will not realize their potential unless we can find ways to help students better use the assistance offered by OLE (Alevén et al., 2003). In this regard, (a) providing students with appropriate help seeking strategies and (b) allowing them to use this help are essential to increase the effectiveness of both OLE and the help offered. Alevén et al. (2003) reported the following conclusions, which are critical considerations regarding the behaviour of help seeking in OLE:

- Different instructional goals result in different types of information,
- Learners often use help systems ineffectively or ignore them altogether,
- A variety of learner characteristics influence help seeking,
- Different types of help may cause different types of help seeking activities,

- Design- and learner-related factors interact in their effect on help seeking and learning.

Since students are in control of the help offered in these environments, they can always get help from a tutor to overcome difficulties (Mercier & Frederiksen, 2008). However, the type and source of the help, the situation in which the help is requested and the characteristics of the learner who wants to receive the help may affect the help behaviour and results. For that reason, it is necessary to identify help seeking behaviour and help seeking types.

1.2 Help Seeking as a Construct in Online Learning Environments

According to Alevén et al. (2003), learner characteristics affect help seeking. In fact, help seeking is considered an individual difference, as are learner characteristics. For example, gender (Brown et al., 2021), age (Davis-Bowman, 2021), type of learning (Neroni et al., 2019), and native/non-native speakers (Sobotka & Raman, 2020) report that factors such as help seeking behaviour are influential.

There are several different names, such as academic help seeking (Cheng & Tsai, 2011; Martín-Arbós et al., 2021), strategic academic help seeking (Karabenick, 1998) or help seeking (Alevén et al., 2003; Pintrich et al., 1993). Help seeking is a critical developmental skill (Nelson-Le Gall, 1981) and a form of behavioral or social self-regulation used by cognitively, emotionally, and behaviorally engaged learners (Butler, 1998; Karabenick & Newman, 2006; Pintrich & Zusho, 2002). When learners cannot solve problems, comprehend text materials or understand the teacher's explanations, their options include continued persistence or abandoning tasks and obtaining assistance from various sources (Karabenick, 1998). These sources may be teachers, classmates, peers or a help seeking system (Alavi, 2011). Alevén et al. (2003) defined help seeking as a unique learning strategy as it entails students being aware that they cannot complete the task or perform successfully without help.

One of the most recent models is proposed by Karabenick and Berger (2013), which consists of eight steps: (1) determine if there is a problem, (2) determine if help is needed and wanted, (3) decide whether to seek help, (4) decide on the type of help needed and wanted, (5) decide whom to ask, (6) solicit help, (7) obtain help, and (8) process the help received. The first step of help seeking is to recognize that one needs help and attempt to seek help. Help seeking may occur due to task analysis in the forethought phase, as a result of self-observation and error identification in the performance phase and as a consequence of self-evaluation that suggests the need for further help in the self-reflection phase (Karabenick & Gonida, 2017). Another important consideration for individuals who seek help is to determine from which source they will ask for help and what kind of help they will ask for. The following forms of help seeking are identified: executive help seeking, instrumental help seeking and help seeking avoidance and Table 1 provides further information.

These forms are as follows: (a) instrumental help seeking when individuals want to solve problems on their own with a minimum amount of help, (b) executive help seeking, when individuals want to solve the problem with minimum effort to simply get the right answer; and lastly (c) help seeking avoidance which occurs when students need help for solving problems but avoid it, even if they know they could not solve the problems without assistance. Indeed, their benefit from such a process depends on (a) cognitive and meta-cognitive

Table 1 Forms of help seeking

Forms of help seeking	Explanation
Executive help seeking	Students seek ready-made answers rather than trying to solve a problem independently (Huet et al., 2016). Children who seek help for problems beyond their current level of competence become more interested in a successful outcome than in the means of achieving it (Nelson-Le Gall, 1987). Considered as effective as those who seek help and want to solve problems quickly (Butler, 1998).
Instrumental help seeking	Students seek the minimum amount of information needed to perform the task independently (Huet et al., 2016). Students ask for a hint that leads them to the solution of the problem (Karabenick & Knapp, 1991). Help seeking where the help asked is limited only to the amount and type required to allow students to solve the problem on their own (Nelson-Le Gall, 1981).
Help seeking avoidance	Involves situations where students acknowledge they need help but do not seek help (Ryan & Pintrich, 1997; Ryan et al., 2001)

competencies, (b) affective-emotional competencies, (c) social competencies, and (d) characteristics of learning environment (Karabenick & Gonida, 2017).

1.3 Help Seeking Scales

There are numerous self-report data collection tools to determine help seeking behaviour. *The Motivated Strategies for Learning Questionnaire (MSLQ)* developed by Pintrich et al. (1993), and *the Online Academic help seeking Questionnaire* developed by Cheng and Tsai (2011). Lau (2022) developed *Online Self-Regulated Learning Questionnaire*, this questionnaire include a sub-factor that name is help seeking and consists of four items. Table 2 presents further information on the data collection tool developed within this study.

It is notable that help seeking behavior has been examined in relation to the variables of development of independent skill and ability (Ames, 1983; Nelson-LeGall, 1981; Newman, 1994), reflecting metacognitive and domain specific skills (Puustinen, 1998; Wood & Wood, 1999), reflect attitude and achievement goals (Arbreton, 1998; Ryan & Pintrich, 1997), epistemological beliefs (Aleven et al., 2003), social, motivational and metacognitive aspects of help seeking (Aleven et al., 2016; Huet et al., 2016), as well as help seeking orientations and contextual factors (Karabenick & Gonida, 2017). The data collection tool designed in this study draws on the scale form developed by Karabenick (2004).

1.4 Current Research

This research aims to address the identified gaps in the literature by developing a valid and reliable scale to measure help seeking behaviours in OLE. This is a novel approach, as there needs to be more consensus on the nature of help seeking and its sub-dimensions in OLE. Developing a valid and reliable scale is a crucial step in our research, as it will provide a standardized tool for measuring help seeking behaviours in OLE, a key aspect of online learning that has yet to be explored. One of the primary objectives of this research is to create a robust psychometric scale that accurately measures help-seeking behaviours in OLE. This involves rigorous validation processes to ensure that the scale can be reliably

Table 2 Scales of help seeking

Author(s)	Scale name	Constructs	Number of item
Pintrich et al. (1993)	Motivated Strategies for Learning Questionnaire (MSLQ)	• Help seeking	4 items
Karabeniç (2004)	Help seeking Scale	• Threat • Avoidance • Expedient goal • Instrumental goal • Source (formal)	3 items 3 items 2 items 2 items 3 items
Pajares et al. (2004)	Computer Science Help seeking Scale	• Instrumental help seeking • Executive help seeking • Avoidance of help seeking • Perceived benefits of help seeking	10 items 10 items 9 items 7 items
Cheng and Tsai (2011)	Online Academic Help seeking Questionnaire (OAHS)	• Information searching • Formal queries • Informal queries	2 items 4 items 4 items

used across diverse cultural contexts, thus facilitating the organization and comparison of scholarly findings. This research also aims to analyze the unique characteristics of help seeking in OLE compared to other social contexts. The study will explore how the digital environment influences help-seeking behaviours and the implications for designing effective learning experiences. The research seeks to advance the conceptualization of help seeking by examining its role in the assessment and learning processes. By focusing on how learners interact with enriched digital content and identifying critical points where help is most needed, this research will provide insights into designing support systems that enhance learning outcomes.

The research has involved a multi-phase approach, starting with a thorough literature review to identify existing measurement tools and conceptual frameworks. Quantitative methods have tested and validated the newly developed scale, ensuring its reliability and applicability across different cultural contexts.

2 Method

The current study presents a data collection tool for behaviours of individuals towards different types of interaction in OLE to identify these latent structures. This tool helps understand what type of help seeking behaviour individuals exhibit when they have difficulty solving a problem in (a) the learning process and (b) the assessment process.

2.1 Study Group

The study group of this research consists of 843 undergraduate students who pursue their education in six different public universities. These students are freshman, sophomore,

junior, and senior-level students at different faculties. The study group consists of 31% (254) male and 69% (580) female students. The participants were contacted through online platforms in the 2020–2021 Fall semester. Students are in the areas of education such as Computer Education and Instructional Technology, Guidance and Counseling, Social Sciences, Turkish Sciences, and Primary Education. Throughout the semester, they continued their learning processes on the Learning Management System (LMS). They interacted with content, assessment, discussion and tutorial on the LMS platform. Before the data collection, they were informed as necessary and provided the access link to the online form.

2.2 Implementation Procedure

The data collection tool was developed through three key processes: design, application, and validation. Figure 1 shows these processes.

The design process involved two steps. The first step included the interaction types that individuals can interact with and exhibit help seeking behaviour in OLE. OLE interaction occurs in four ways: learner-learner, learner-content, learner-instructor, and learner-assessment (Şahin et al., 2017). Learners in OLE may have difficulty understanding content or an assignment or solving a problem and thus exhibit help seeking behaviour. Thus, interactions between learner-content and learner-assessment are considered in the design of the data collection tool. Interactions, where learners’ help needs arise in an e-learning environment, are content and assessment modules, especially in LMSs. Forums reflecting learner-learner interactions are modules where learners meet their help seeking needs. The current scale, which is the subject of this research, aims to measure the behaviour of learners when they need help. For this reason, learner-learner interactions are excluded.

The second step involved identifying the sub-dimensions of help seeking behaviors. This step, therefore, analyzed the existing scales in the literature (Table 2) and the constructs of these scales. As a result, the following sub-factors are hypothetically identified: (i) instrumental help seeking, (ii) executive help seeking, (iii) threat of help seeking, (iv) avoidance of help seeking, and (v) source of help seeking.

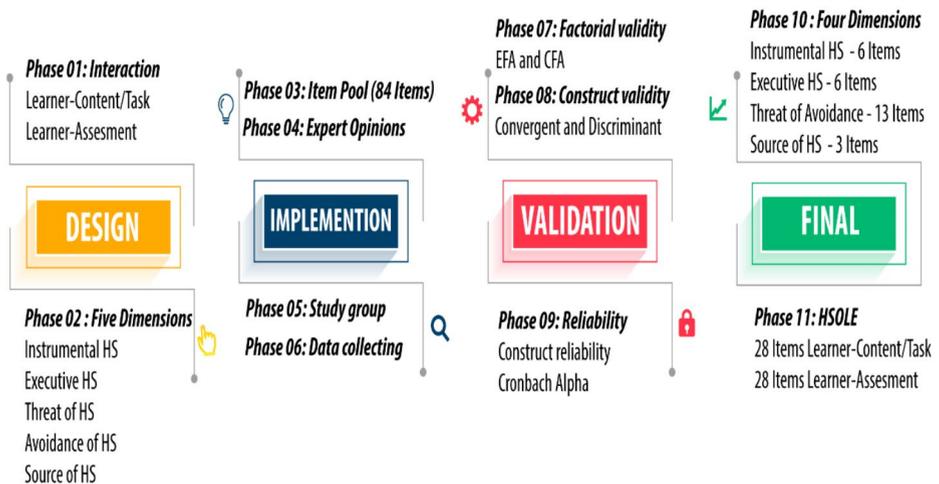


Fig. 1 Process of the data collection tool

The application process encompasses structuring the item pool, obtaining expert opinions, determining the study group, and collecting data. Firstly, interactions and the sub-dimensions of help seeking behaviour in OLE were identified to form an item pool. After that, the item pool was presented to different field experts to ensure its content validity. The item pool was revised and finalized for the pilot study based on expert opinions. The pilot form was presented to undergraduate students in different universities online. Participant responses were obtained over approximately six weeks. This study then went through the final process, that is, validation.

As it is known, one of Cronbach's most important contributions to the psychometrics literature is construct validity. Cronbach and Meehl (1955) stated that construct validity should consist of correlations between constructs. Factor analysis and similar complex analyzes were difficult to perform since computers were not yet sufficiently developed in those days. Campbell and Fiske (1959) suggested this analysis based on simple correlation calculations, "*Multi Trait-Multi Method (MTMM)*". The origin of the external criterion technique mentioned by the anonymous referee is based on MTMM. However, Fornell and Larcker (1984) have brought a different perspective to convergence and discriminant validity with an approach based on equality analysis. An important advantage of this approach is that it allows the construct validity of the targeted structure to be tested without the need for different psycho-educational constructs (criterion constructs). Today, this approach comes to the fore in all psychometric research. For this reason, the Fornell and Larcker approach was determined in the related study.

In this context, the validation process involved performing (i) Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) to assess the factorial validity of the form, analyzing (ii) convergent and discriminant validity to test its construct validity, and (iii) calculating construct reliability and Cronbach's Alpha coefficients to evaluate reliability. Following the validation process, the data collection tool that was hypothetically composed of five factors was reduced to four factors. The [results](#) section provides further information on this. The resulting tool is a valid and reliable measurement tool with 56 items (28 items for each form of interaction) and four factors in total. In addition to this, the scale form was developed in Turkish. In order to be used in English or other languages, validity and reliability studies should be carried out again.

3 Results

The following analyses were conducted respectively:

- EFA, KMO and Bartlett's test to ensure that the data set is appropriate for analysis,
- CFA and test of alternative models for factorial validity,
- Test of convergent and discriminant validity for construct validity,
- Cronbach's Alpha and construct reliability tests for reliability.

3.1 Dimensions of Help Seeking in OLE

The data collection tool consists of two main constructs. One of these is intended to determine the help seeking behaviors of individuals when they have problems with the content or

assignment in the online learning environment. This structure is called the learning process help seeking. The other includes the items designed to determine the help seeking behaviours of individuals when they have difficulty in their assessment tasks. This structure is called the assessment process help seeking. The pilot study presented 80 items, containing 40 items for each construct. These two constructs were analyzed separately. First, EFA was conducted to determine the empirical relationships between items and factors. This analysis showed that the KMO and Bartlett's test statistics for (a) learning process help seeking ($X^2=14344.40$, $df=378$, $p<.05$) and (b) assessment process help seeking ($X^2=18261.21$, $df=378$, $p<.05$) mean that the dataset is scalable (Tabachnick & Fidell, 2019). The analysis results also indicated that the four-factor structure explains 61.98% of the variance for learning process help seeking and 67.71% of the variance for assessment process help seeking.

3.2 Confirmatory Factor Analysis and Model Comparison

Factor analysis seeks to evaluate whether the collected data align with the theoretically expected model and determine if the measures used have indeed measured what they are purported to measure (Matsunaga, 2010). It is also reported that it is necessary to compare the scale structure with the alternative models through CFA to design the best possible model (Noar, 2003; Teo, 2010). Thus, this current study tested the hypothetical model's single-factor, four-factor, and five-factor structure. Table 3 presents the obtained fit indices and RMSEA values.

As shown in Table 3, the fit indices obtained for the alternative models are considered as adequate fit (Schermelel-Engel & Moosbrugger, 2003). The results of the factorial analysis for the alternative models imply that the five-factor model is the most appropriate. These five factors in the hypothetical model are instrumental help seeking, executive help seeking, avoidance of help seeking, threat of help seeking, and source of help seeking. However, the calculations of discriminant validity on the five-factor structure yield that the correlation coefficient between the factors of threat of help seeking and avoidance of help seeking damaged the discriminant validity. Although the experts stated that these two constructs should be considered separate, they were combined, which resulted in a four-factor structure. Detailed information about the experts was presented in Table 4.

Experts consist of six researcher and three different domains. The measurement and assessment experts contributed in terms of both content and criterion validity, and validity and reliability analysis. Psychology experts contributed to the structure and item pool. The instructional technology specialist contributed to the creation of the item pool and the management of the process.

Table 3 CFA results of the alternative models

Models	Subscales	χ^2 /df	RMSEA	NFI	NNFI	CFI
Single-factor	Learner process	5.47	0.07	0.96	0.96	0.97
	Assessment process	7.02	0.09	0.97	0.97	0.97
Four-factor	Learner process	3.36	0.05	0.97	0.98	0.98
	Assessment process	4.40	0.06	0.97	0.98	0.98
Five-factor	Learner process	3.20	0.05	0.97	0.98	0.98
	Assessment process	3.73	0.06	0.98	0.98	0.98

Table 4 Information about the experts

Domain of expert	Title	Frequency
Measurement and assessment	Prof. Dr.	2
Psychology	Assoc. Prof.	1
Instructional technology	Prof. Dr.	1
	Ph.D.	2

The validity and reliability analyses of the designed measurement tool were carried out on this four-factor structure. Figure 2a and b presents the CFA values of this structure. Further, Table 5 demonstrates the factor loads of the items to increase readability.

As seen in Table 5, factor loading greater than 0.4 is considered acceptable, except for item 39. However, the factor loading of this item was 0.35. The convergence and discriminant validity were tested, and they were not removed from the item pool to ensure content validity since they did not impair the validity of the convergence and discriminant.

3.3 Construct Validity

To test construct validity, this study also performed convergent and discriminant validity analyzes, which are recommended by Fornell and Larcker (1981) and involve calculating the AVE value of each factor. The tool's reliability was measured considering both Cronbach's Alpha values (Cronbach, 1951) and construct reliability (McDonald, 1985). Tables 6 and 7 present the findings on the AVE, construct reliability, and Cronbach's Alpha reliability coefficients.

The AVE value higher than 0.50 calculated for convergent validity can be taken as evidence of convergent validity (Peterson, 2000). Remarkably, all AVE values exceed the specified 0.50 threshold value. A reliability coefficient higher than 0.70 is also presented as evidence of the reliability of a measurement result (Nunnally & Bernstein, 1994). Hence, it is reasonable to conclude that the tool is convergently valid and reliable. Tables 8 and 9 offer the findings on discriminant validity.

This study drew on the square roots of AVE values to test discriminant validity. The square roots of the AVE values obtained for each sub-factor should be lower than the correlation coefficients between the sub-factors (Fornell & Larcker, 1981). Based on this, it is plausible to argue that the tool is discriminant valid.

4 Discussion

It is known that learners ask for help, and providing appropriate assistance makes learning more effective in OLE (Aleven et al., 2003). From this standpoint, it is a prerequisite to understanding the levels of help seeking or the tendencies of learners in OLE to seek help. This present study has designed a measurement tool intended to determine the help seeking behaviours of learners in these environments. This measurement tool is designed to assess two different behaviours of learners in such environments. These learners may exhibit help seeking behaviours in (a) learning process help seeking or (b) assessment process help seeking. The data collection tool presented in this study essentially draws on these two forms of interaction and includes 56 items, containing 28 items for each form of interaction. Each interaction dimension further consists of the sub-factors of (a) instrumental help seeking,

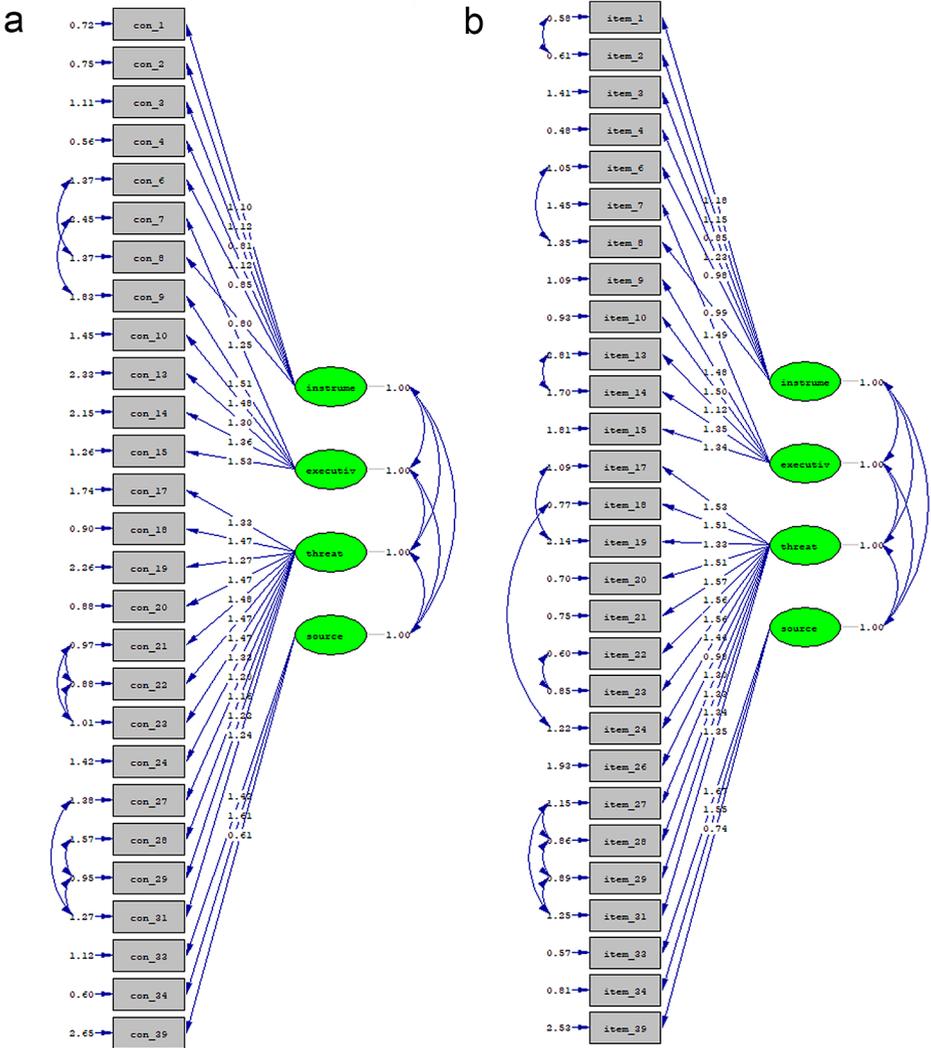


Fig. 2 a Factor structure of learning process help seeking b. The factor structure of the assessment process help seeking

(b) executive help seeking, (c) threat of avoidance, and (d) source of help seeking. The tool is a 7-point scale.

Considering that seeking help is an important metacognitive skill and is likely to affect learning in many cases, it is necessary to find ways to design help and integrate help design into OLE (Aleven et al., 2003). In this way, it will be possible for learners to be better help seekers to benefit from the help opportunities offered at the maximum level (Aleven & Koedinger, 2001). The literature provides evidence that the “one size fits all” strategy is not suitable for designing help systems. Learners with different characteristics need different types of help (Aleven et al., 2003). Defining help seeking

Table 5 Factor scores of the items according to the CFA

Sub-construct	Item no	Factor load	
		Learning process help seeking.	Assessment process help seeking
Instrumental help seeking	Item1	0.79	0.84
	Item2	0.79	0.83
	Item3	0.61	0.58
	Item4	0.83	0.87
	Item6	0.59	0.69
	Item8	0.56	0.65
Executive help seeking	Item7	0.63	0.78
	Item9	0.74	0.82
	Item10	0.78	0.84
	Item13	0.65	0.55
	Item14	0.68	0.72
	Item15	0.81	0.71
Threat of Avoidance	Item17	0.71	0.83
	Item18	0.84	0.86
	Item19	0.65	0.67
	Item20	0.84	0.87
	Item21	0.83	0.88
	Item22	0.84	0.90
	Item23	0.93	0.86
	Item24	0.74	0.79
	Item26	0.71	0.58
	Item27	0.68	0.77
	Item28	0.78	0.82
	Item29	0.74	0.82
Source of help seeking	Item31	0.56	0.77
	Item33	0.80	0.91
	Item34	0.90	0.87
	Item39	0.35	0.42

Table 6 AVE and reliability coefficients for the subscale of the learning process help seeking

Dimensions	AVE	Structural reliability (ω)	Cronbach's alpha (α)
Instrumental help seeking	0.50	0.85	0.86
Executive help seeking	0.52	0.86	0.87
Threat of Avoidance	0.58	0.95	0.94
Source of help seeking	0.52	0.75	0.71

profiles can be considered a prerequisite for examining the relationship between learner characteristics and help seeking profiles. In this study, a measurement tool with proven validity and reliability was developed, which aims to diagnose the help seeking profiles of learners both in the learning process and in the problem-solving process for this pre-

Table 7 AVE and reliability coefficients for the subscale of the assessment process help seeking

Dimensions	AVE	Structural reliability (ω)	Cronbach's alpha (α)
Instrumental help seeking	0.56	0.88	0.89
Executive help seeking	0.55	0.88	0.88
Threat of Avoidance	0.65	0.96	0.96
Source of help seeking	0.59	0.80	0.76

Table 8 Discriminant validity measures in learning process help seeking

	Symbol	1	2	3	4
Instrumental help seeking	1	0.70*			
Executive help seeking	2	-0.09	0.72*		
Threat of avoidance	3	-0.28	0.59	0.76*	
Source of help seeking	4	-0.02	0.20	0.32	0.72*

Table 9 Discriminant validity measures in assessment process help seeking

	Symbol	1	2	3	4
Instrumental help seeking	1	0.75*			
Executive help seeking	2	-0.13	0.74*		
Threat of avoidance	3	-0.36	0.68	0.81*	
Source of help seeking	4	0.10	0.34	0.28	0.77*

requisite. Help seeking is an individual difference and an important part of the learning process that should occur in designing individualized learning environments.

Help seeking studies in OLEs contribute to a comprehensive understanding of this behaviour (Yang & Stefaniak, 2023). Within the scope of this research, a measurement tool was developed to determine help seeking profiles in OLE. This tool provides an important input to reveal the profiles of learners in the learning and assessment processes in OLEs according to their help seeking behaviours. In this way, OLEs can be designed according to the help seeking expectations and needs of learners (Mayweg-Paus et al., 2021). In addition, examining the relationships between learners' help seeking behaviours determined in a self-report manner and the patterns determined based on log data is another topic that needs to be investigated. For example, in the problem-solving process, executive help seekers tend to receive correct response feedback, instrumental help seekers tend to receive hint, and help seekers avoiders tend to receive no feedback. However, it is suggested that research should be conducted to provide empirical evidence for this situation.

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Data availability Data can be retrieved with the permission of the researcher in order to be used in different research studies.

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