

# TECHNOLOGY ACCEPTANCE AND SELF-REGULATORY APTITUDE TOWARDS MOBILE-BASED ENGLISH VOCABULARY LEARNING AMONG PAKISTANI ESL LEARNERS

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## ABSTRACT

The study examines Pakistani English as a Second Language (ESL) learners' attitudes and self-regulatory aptitude towards mobile-assisted language learning (MALL). Although MALL is increasingly adopted in Pakistani higher education, limited empirical research has examined how mobile-assisted learning shapes Pakistani ESL learners' attitudes and self-regulated learning in vocabulary acquisition.

This study is a quantitative cross-sectional survey design. The primary objective is to explore graduate ESL learners' perceptions of mobile-based vocabulary learning, grounding the Technology Acceptance Model (TAM) and Garrison's (1997) self-regulated learning framework. Data is collected from 80 graduates of universities in Hyderabad, Pakistan, using an adapted questionnaire. Descriptive statistical analyses revealed ESL learners' perception of Perceived Usefulness (PU) and Ease of Use (PEOU), i.e., TAM. The reliability results show high internal consistency, i.e., Cronbach's alpha of 0.887 for PEOU and 0.845 for PU. The findings alongside provide positive results for self-motivation, self-monitoring, and self-management (Garrison, 1997). The findings not only highlight the potential of mobile-assisted learning to support autonomous vocabulary learning in resource-constrained ESL contexts but also underscore the need for pedagogical scaffolding.

In short, the study contributes to empirical baseline data on MALL acceptance in the Pakistani higher education system for ESL instructors, i.e., university teachers, curriculum developers, and policy makers, to enhance autonomous vocabulary learning.

**Keywords:** mobile-assisted language Learning, self-regulated learning, technology acceptance model, perceived ease of Use, perceived usefulness, Higher Education of Pakistan

## Introduction

English proficiency plays a central role in academic and professional mobility in Pakistan (Qadri et al., 2025). However, English vocabulary learning is still taught with a traditional and exam-oriented approach at the university level (Anwar, Z., 2018). Previous studies have shown that classroom instructions often prioritize reading and writing skills.

Vocabulary learning is made incidental rather than strategic (Akhtar et al. 2025).

Accordingly, the difficulties are attributed directly to the Pakistani graduate students' struggles with ELT classroom methods (Malik and Nayab, 2024). Therefore, in vocabulary learning, Students' behavior can be positively shaped with proper educational guidance. Recent advancements in mobile technology have introduced new possibilities for language

learning beyond classroom boundaries (Nazarova, 2024). Mobile-Assisted Language Learning (MALL) enables learners to access vocabulary resources anytime and anywhere, thereby promoting flexibility, personalization, and learner autonomy.

Education transforms, provides structured values, and fosters responsible attitudes in learners (Bandura, 1977; Vygotsky, 1978 & Zimmerman, B.J 2002). The paper descriptively explores the perceptions of ESL learners for Mobile-based vocabulary learning, i.e., including attitudes and self-regulatory aptitude in English vocabulary acquisition. The integration of mobile technologies aligns with constructivist and socio-cognitive perspectives of learning (Bandura, 1977; Vygotsky, 1978; Zimmerman, 2002), which emphasize self-regulation, active engagement, and learner agency.

#### Research Objective

1. Investigate the attitudes of Pakistani ESL students on the use of mobile-based learning to learn English Vocabulary in terms of:

- Perceived Ease of Use,
- Perceived Usefulness,
- and Readiness.

2. Investigate the Self-regulatory aptitude of the Pakistani ESL students in using mobile-based learning to learn English Vocabulary in terms of:

- Self-motivation,
- Self-monitoring
- And Self-management

#### Research Questions

1. What are the attitudes of Pakistani ESL students in using mobile-based learning to learn English Vocabulary in terms of:

- Perceived ease of Use
- Perceived usefulness
- And Readiness

2. What is the Self-regulatory aptitude of the Pakistani ESL students in using mobile-based learning to learn English Vocabulary in terms of:

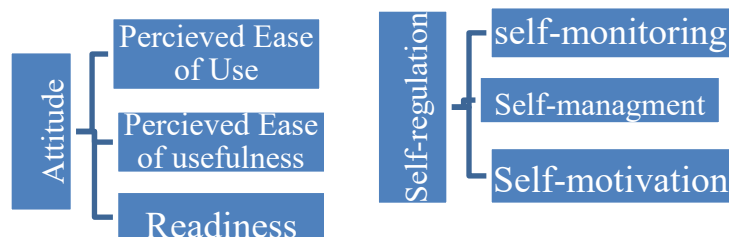
- Self-motivation,
- Self-monitoring
- And Self-management

#### Conceptual Framework

Some concepts are handled in this study. The first main concept is students' attitudes towards using the mobile-based learning method to learn English vocabulary, which constructs the baseline for technology acceptance in vocabulary learning among Pakistani graduates at universities in Pakistan.

The concept is based on the views of an ESL graduate, including factors such as Perceived Ease of Use, Perceived Ease of Usefulness, and Readiness derived from the Technology Acceptance Model (TAM). According to Almadhady et al. (2020), these factors may affect ESL learners' attitudes. He also said that perceiving the ease and usefulness of results in processing the higher attitudes for learning English vocabulary. Along with this, their readiness would also contribute to raising their attitude and to adopting mobile-based learning as a system for learning English Vocabulary.

The second main concept in this study is related to students' self-regulatory aptitude. This concept is related to students' self-reliability, including self-motivation, self-management, and self-monitoring strategies (Zhang & Perez-Paredes, 2021). When students manage and regulate their learning, they control their own learning and regulate their entire process of learning. Which reduces boredom and overcomes stress (Lei et al., 2022; Tseng et al., 2006). This includes their ability to select and use various learning resources and methods, such as the use of mobile-based learning (Lei et al., 2022).



**Figure 1: The conceptual framework of the study**

### Literature Review

The literature review is developed grounded in the theories utilized in this study.

### Mobile Assisted Language Learning for Vocabulary Development

Recently, mobile-assisted language learning has emerged as a powerful tool for vocabulary development because of its dynamic features. For example, the personified, flexible, and ubiquitous nature of mobile phone applications enables ESL learners to learn vocabulary effectively. It also provides an on-demand experience for ESL learners (Kohnke et al, 2019). They noted that students of higher education respond more strongly to those applications that are user-friendly, have touch screen functionality, and have the capacity to customize the situations. Wang et al (2021) discussed how vocabulary is retrieved in the students' mind for permanently. They noted that vocabulary is retained permanently through visual and auditory channels in the learners' minds. Kohnke et al (2019), in their support, noted that words on mobile phone screens can stimulate both channels of learners.

Mobile-assisted language learning provides multimodal input combining text, audio, visuals, and game features in interactive applications during ESL learning in classrooms. Unlike traditional methods, MALL provides immediate feedback and integrates the real-life situation in ESL learning (Kukulka-Hulme, 2012; Stockwell, 2010). For instance, mobile applications like Duolingo and Quizlet enable spaced repetition and adaptive algorithms that align with users' proficiency levels to foster deeper semantic processing.

Empirical studies concluded that mobile-assisted language learning enhances vocabulary retention, engagement, and motivation. Research by Plonsky and Ziegler (2016) found that mobile interventions, i.e., moderate to large-sized mobile devices, influence L2 vocabulary gains. This attributes the success to portability. Similarly, randomized controlled trials, such as those by Lu (2016), reported that Taiwanese EFL learners using Mobile-assisted language learning outperformed control groups in recall tasks, with retention rates 20-30% higher after four weeks. Fadhil et al. (2019) observed that Arabic students who practice vocabulary via gamified mobile tools reported motivation.

Despite the advantages of mobile-assisted language learning, it centers on learners' perceptions and acceptance of technology. Therefore, the Technology Acceptance Model (TAM) posits two streams for the learners' perceptions, i.e., perceived usefulness and ease of use. The variables are critical predictors of adoption (Davis, 1989). Research supports this in language learning contexts; for example, Mahdi (2019) surveyed 200 Saudi undergraduates and found that positive attitudes toward mobile usability correlated strongly with vocabulary improvements, while the uncertainty about the mobile phone as a device and its reliability led to dropout rates of 25%. Without fostering these attitudes, i.e., through intuitive design and teacher scaffolding, interventions risk low uptake and diminished outcomes (Hsu, 2012).

Moreover, Mobile phones allow learners to gain their goals, monitor their progress, and control learning pace (Zhang & Pérez-Paredes, 2021). Their study highlights how learners improve

autonomy for vocabulary learning when they actively regulate their ESL learning. Although international research has extensively explored the advantages of Mobile-assisted language learning in vocabulary development, limited empirical evidence exists within Pakistani higher education, particularly regarding the combined examination of TAM constructs and self-regulatory aptitude, Vocabulary-specific mobile learning at the graduate level, and empirical validation using reliability analysis in the Pakistani ESL context and comparative data from both public and private universities.

Most Pakistani studies focus either on general technology use or classroom-based interventions without analyzing learners' psychological acceptance and regulatory readiness. Therefore, this study addresses a contextual and theoretical gap by integrating TAM and self-regulated learning constructs in examining mobile-based vocabulary learning among Pakistani graduate students.

### Method

The section presents the methodology used in this study. The research methods utilized support the study's research design, analysis, and procedures.

### Research Design

This study adopts a quantitative descriptive cross-sectional survey design. It explores Pakistani graduate ESL learners' attitude and self-regulatory Aptitude towards the use of mobile-based learning for English Vocabulary Acquisition. According to Cresswell (2013), A descriptive Survey is appropriate when a researcher must examine learners' perception, self-reported regulatory behavior, and readiness. Therefore, this study is a one-group survey, unlike experimental or quasi-experimental research, which is commonly used to examine cause-and-effect relationships between variables. In true experimental studies, participants are usually randomly assigned to different groups, and they are often administered pretests and posttests. However, in many university settings, random assignments are not possible for various reasons (Trochim, 2020). 80 participants are provided with an adapted questionnaire by Almuqayteeb (2009); Botero et al. (2019); Elzaalouk (2010); García Botero et al. (2019);

Zbick et al. (2014; Zhang & Perez-Paredes (2021), based on the TAM model proposed by Davis et al. (1989) and the self-regulated learning proposed by Garrison (1997) on attitude and self-regulatory aptitude from one of the private and public universities in Hyderabad. This research design is also used in studies by Alreshidi et al. (2023), Baskaran et al. (2023), and Kurki et al. (2021). Furthermore, this questionnaire (see Appendix) will be used to elicit three types of information from Pakistani graduate students: biodata, attitudes towards mobile-based learning, and self-regulatory aptitudes. The data obtained from the questionnaire is then analyzed using Statistical Packages for Social Sciences (SPSS) to answer the research questions. The analysis includes descriptive tests in SPSS to determine the means, frequency, and percentages of the students and their self-regulating aptitude level. The findings are analyzed in the form of mean, minimum, maximum, and standard deviation to answer the research questions.

In short, unlike experimental or quasi-experimental designs, which require control groups and pre- and post-intervention measures, the present study focuses on learners' existing experiences and perceptions of technology-enhanced learning. Therefore, a survey-based approach is deemed suitable to address the research questions.

### Data Collection

The first research question is about students' attitudes towards acceptance of the mobile-assisted language learning for improving vocabulary, in terms of their ease of Use, usefulness, and readiness. To answer this research question, the data outcomes are obtained from the first part of the questionnaire. The items are analyzed with the help of SPSS. The responses of the students are recorded on google survey form and then transferred on excel. The Excel sheet with three factors, i.e., ESL learners' perceived ease of use and perceived ease of usefulness, is uploaded on SPSS to record the mean, frequency, minimum, maximum, and Standard Deviation (SD).

The second research question is about the ESL learners' Self-regulatory aptitude in the use of mobile-based learning to acquire English vocabulary. While answering this research

question, the second part of the questionnaire, i.e., comprises items like self-management, self-motivation, and self-monitoring. These items are also transferred to excel sheet from the responses achieved in the Google Form. The Excel sheet was first uploaded to SPSS for the descriptive analysis.

### Data Analysis

#### Data Analysis for RQ1

This research question investigates ESL learners' perceived ease of use and usefulness as derived

from the technology acceptance model. It also explores the learners' readiness and attitude towards the use of mobile-assisted language learning and vocabulary development.

To investigate these perceptions and readiness levels, data is collected through a questionnaire i.e., which is statistically analyzed using SPSS. Furthermore, data analysis employs descriptive statistics, reliability tests, and correlation analyses.

### Perceived ease of Use

**Table 1**  
*Case Processing Summary of Perceived Ease of Use in MALL for Vocabulary Acquisition*

		N	%
Cases	Valid	79	97.9
	Excluded <sup>a</sup>	1	2.1
	Total	79	100.0

a. Listwise deletion based on all variables in the procedure.

The case processing summary in Table 1 shows 79 valid responses of 97.9 percent. It indicates minimal missing data and reliable dataset integrity.

**Table 2**  
*Reliability Statistics of Perceived Ease of Use in MALL for Vocabulary Acquisition*

Cronbach's Alpha	N of Items
.887	5

The reliability statistics in Table 2 demonstrate high internal consistency. It indicates Cronbach's Alpha of 0.887 in five items of the questionnaire related to PEOU. An alpha value above .80 indicates strong reliability. It suggests that the PEOU items consistently measure the same construction. This confirms that the questionnaire items effectively captured learners' perceptions of ease of use.

**Table 3**  
*Descriptive Statistics of Perceived Ease of Use in MALL for Vocabulary Acquisition*

	N	Minimum	Maximum	Mean	Std. Deviation
PEOU1	80	1	5	3.74	1.375
PEOU2	80	1	5	3.64	1.421
PEOU3	80	1	5	3.79	1.250
PEOU4	80	1	5	3.70	1.209
PEOU5	80	1	5	3.34	1.387
Valid N (listwise)	79				

The table above shows that the mean scores range from 3.34 to 3.79 on a 5-point Likert scale. It indicates moderate agreement with statements regarding ease of use for MALL in learning vocabulary. PEOU3 has the highest Mean (M) of 3.79 and standard deviation of 1.25, which suggests that learners generally found MALL tools user-friendly. PEOU5 represents the lowest Mean (M) of 3.34 and a standard deviation of 1.39. It means slightly lower ease in this aspect. Standard deviations ranged from 1.21 to 1.42, reflecting some variability in participants' perceptions. The valid listwise N for all items was 79.

*Perceived Usefulness*

**Table 4**

*Case Processing Summary for Perceived Usefulness of MALL in Vocabulary Learning*

		N	%
Cases	Valid	80	100.0
	Excluded <sup>a</sup>	0	.0
	Total	80	100.0

a. Listwise deletion based on all variables in the procedure.

The case processing summary in Table 4 of perceived usefulness, i.e., variable for research question one, indicates that all 47 participants from private and public universities of Hyderabad, Sindh, provide valid responses.

**Table 5**

*Reliability Statistics for Perceived Usefulness of MALL in Vocabulary Learning*

Cronbach's Alpha	N of Items
.845	3

The reliability statistics demonstrate high internal consistency. It indicates Cronbach's Alpha of 0.845 in three items of the questionnaire related to PU. An alpha value above .80 indicates strong reliability. It suggests that the PU items consistently measure the same construction.

**Table 6**

*Descriptive Statistics for Perceived Usefulness of MALL in Vocabulary Learning*

	N	Minimum	Maximum	Mean	Std. Deviation
PU1	80	1	5	3.79	1.350
PU2	80	1	5	3.87	1.312
PU3	80	1	5	3.64	1.421
Valid N (listwise)	80				

*Readiness*

**Table 9**

*Case Processing Summary for the Readiness of MALL in Vocabulary Learning*

		N	%
Cases	Valid	80	100.0
	Excluded <sup>a</sup>	0	.0
	Total	80	100.0

a. Listwise deletion based on all variables in the procedure.

The case processing summary in Table 09 of Readiness, i.e., variable for research question one, indicates that all 80 participants from private and public universities of Hyderabad, Sindh, provide valid responses.

**Table 10**

*Reliability Statistics for Readiness of MALL in Vocabulary Learning*

Cronbach's Alpha	N of Items
.876	3

The reliability statistics in Table 10 demonstrate high internal consistency. It indicates Cronbach's Alpha of 0.876 in three items of the questionnaire related to Readiness. An alpha value above .80 indicates strong reliability. It suggests that the Readiness items consistently measure the same construction.

Table 11  
*Descriptive Statistics for Readiness of MALL in Vocabulary Learning*

	N	Minimum	Maximum	Mean	Std. Deviation
Readiness 1	80	1	5	3.96	1.301
Readiness 2	80	1	5	3.74	1.310
Readiness 3	80	1	5	3.64	1.342
Valid N (listwise)	80				

Table 11 indicates descriptive measures of learners' readiness toward Mobile-Assisted Language Learning (MALL). The results represent a moderately high level of readiness for learning vocabulary when using MALL. Item R1 records the highest mean score of 3.96, suggesting that graduate students at the university level show strong agreement of readiness for mobile-assisted language learning for vocabulary learning in ESL classrooms.

### Data Analysis for RQ2

This research question investigates ESL learners' Self-management, Self-monitoring, and Self-motivation, grounded in the concept of Self-regulation. It also explores learners' self-reliance and autonomous nature to determine their self-regulatory language learning aptitude in the use of mobile-assisted language learning and vocabulary development.

To investigate these aspects of learners' aptitude and self-regulation, data is collected through a questionnaire i.e., which is statistically analyzed using SPSS.

### Self-management



Table 12  
*Case Processing Summary for Self-management Items for Self-regulatory Aptitude*

		N	%
Cases	Valid	80	100.0
	Excluded <sup>a</sup>	0	.0
	Total	80	100.0

a. Listwise deletion based on all variables in the procedure.

The case processing summary in Table 12 of Self-management, i.e., variable for research question two, indicates that all 80 participants from private and public universities of Hyderabad, Sindh, provide valid responses.

Table 13  
*Reliability Statistics for Self-management Items for Self-regulatory Aptitude*

Cronbach's Alpha	N of Items
.750	4

The reliability statistics in Table 13 demonstrate good internal consistency. It indicates Cronbach's Alpha of 0.750 in four items of the questionnaire related to self-management. An alpha value of .70 indicates good reliability. It suggests that the self-management items consistently measure the same construct among ESL learners at the university level for vocabulary development.

Table 14  
*Descriptive Statistics for Self-management Items for Self-regulatory Aptitude Via MALL*

	N	Minimum	Maximum	Mean	Std. Deviation
Self-management 1	80	1	5	3.81	1.313

Self-management 2	80	1	5	3.04	1.444
Self-management 3	80	1	5	2.96	1.459
Self-management 4	80	1	5	3.45	1.411
Valid N (listwise)	80				

The descriptive statistics in the above table indicate a moderate level of self-management among ESL learners at the University of Pakistan. It is because Learners prefer independent planning while learning vocabulary. They also demonstrate structured behaviors, such as setting strict timeframes or consistent scheduling. The relatively lower mean values for certain items, i.e., Self-management 3, suggest that mobile access alone does not ensure disciplined learning management. Additionally, the relatively high standard deviations indicate variability in learners' regulatory competencies. These findings imply that although learners exhibit positive attitudes toward mobile learning, self-management skills require pedagogical scaffolding to become more systematic and effective.

### *Self-motivation*

**Table 15**  
*Reliability Statistics of Self-motivation of MALL in Vocabulary Learning*

Cronbach's Alpha	N of Items
.780	4

The reliability statistics in Table 15 demonstrate good internal consistency. It indicates Cronbach's Alpha of 0.780 in four items of the questionnaire related to self-motivation. An alpha value of .70 indicates good reliability. It suggests that the self-motivation items consistently measure the same construct for vocabulary development among ESL learners at both private and public universities.

**Table 16**  
*Descriptive Statistics of Self-motivation of MALL in Vocabulary Learning*

	N	Minimum	Maximum	Mean	Std. Deviation
Self-motivation 1	80	1	5	3.53	1.457
Self-motivation 2	80	1	5	3.85	1.367
Self-motivation 3	80	1	5	3.85	1.335
Self-motivation 4	80	1	5	2.61	1.453
Valid N (listwise)	79				

Table 16 depicts the descriptive statistics for the four items related to the self-motivation of the graduate students of MALL while learning ESL vocabulary. The findings represent a moderate level of mean score with slight noticeable variation in all four items. Firstly, the Self-motivation 2 and 3 have recorded the highest mean score, which is equally similar, i.e., 3.85 Mean value. It demonstrates a positive motivational response of the ESL learners towards MALL for vocabulary learning. Self-motivation 1 item records slightly lower means score with a standard deviation of 1.45, still positive self-regulatory aptitude. Thirdly, the standard deviation values i.e., from 1.335 to 1.457 indicate moderate variability in responses, suggesting differences in learners' motivational levels.

### *Self-monitoring*

**Table 17**  
*Case Processing Summary of Self-monitoring Via MALL during Vocabulary Learning*

		N	%
Cases	Valid	80	100.0
	Excluded <sup>a</sup>	0	.0

Total	80	100.0
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a. Listwise deletion based on all variables in the procedure.

The case processing summary in Table 17 of Self-monitoring, i.e., variable for research question two, indicates that all 80 participants from private and public universities of Hyderabad, Sindh provide valid responses.

Table 18

*Reliability Statistics of Self-monitoring Via MALL during Vocabulary Learning*

Cronbach's Alpha	N of Items
.730	2

The reliability statistics in Table 18 demonstrate good internal consistency. It indicates Cronbach's Alpha of 0.730 in two items of the questionnaire related to self-monitoring. An alpha value of .70 indicates good reliability. It suggests that the self-monitoring items consistently measure the same construct for vocabulary development among ESL learners at both private and public universities.

Table 19

*Descriptive Statistics of Self-monitoring Via MALL during Vocabulary Learning*

	N	Minimum	Maximum	Mean	Std. Deviation
Self-monitoring 1	80	1	5	3.96	1.268
Self-monitoring 2	80	1	5	3.55	1.427
Valid N (listwise)	80				

The descriptive analysis indicates learners' moderately high levels of self-monitoring in MALL for vocabulary learning. The relatively high mean in item 1 for responsibility in vocabulary learning suggests that students acknowledge their role in regulating learning activities. However, the slightly lower mean for goal-setting behaviors in item two reflects that while learners are comfortable using mobile phones, structured regulatory strategies may not be fully developed. The variation in responses, as the standard deviation is higher than 1, indicates diversity in regulatory readiness among participants.

**Discussion**

The findings indicate that Pakistani university ESL learners demonstrate moderately positive attitudes toward technology acceptance for vocabulary learning via MALL. The moderate to the highest mean score in some values, including perceived ease of use, perceived usefulness, suggests that ESL graduate learners generally accept mobile devices for vocabulary acquisition. It is due to the features, including the customization of content for vocabulary acquisition, easy to handle and can be learnt anywhere. These findings align with Davis

(1989) and Mahdi (2019), who found that usability perceptions significantly predict technology adoption.

However, the results for self-regulatory aptitude indicate variations in responses. While self-monitoring demonstrates relatively strong mean values, self-management and certain self-motivation items show lower averages. The findings suggest that they are goal-oriented but struggle in self-managing strategies because the students may feel distracted when using MALL. ESL learners perceive mobile tools positively, but their ability to independently structure vocabulary learning remains developing rather than fully autonomous. This partially supports Zhang and Pérez-Paredes (2021), who argue that mobile access does not automatically guarantee strong self-regulation.

Importantly, the findings confirm that technology acceptance among Pakistani graduates does not necessarily translate into strong self-management behaviors, i.e., because the reasons include that they are not completely autonomous. This highlights the need for structured pedagogical scaffolding to develop regulatory skills alongside technological integration.

Thus, the study contributes empirical evidence from Pakistan demonstrating that while learners are technologically ready, self-regulatory aptitude requires further instructional support in ESL classrooms.

### Conclusion

This study investigates Pakistani university ESL learners' attitudes and self-regulatory aptitude toward mobile-based English vocabulary learning. The results show moderately positive perceptions of perceived ease of use, usefulness, and readiness. The study suggests that learners are open to adopting mobile technologies for vocabulary acquisition. Reliability measures confirmed the internal consistency of the questionnaire. While learners displayed promising levels of self-monitoring and motivation, certain aspects of self-management reveal moderate or inconsistent regulatory behaviors. These findings indicate that although mobile-assisted language learning holds potential in Pakistani higher education, technology acceptance alone is insufficient for fostering autonomous vocabulary learning. Structured pedagogical guidance remains essential. The study contributes baseline empirical evidence to the limited Pakistani literature, integrating the Technology Acceptance Model and self-regulated learning frameworks. Future research should employ larger samples and inferential statistical analyses.

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