Chabahar Maritime University
Iranian Journal of English for Academic Purposes ISSN: 2476-3187
IJEAP, 2021, 11(4), 1-21 (Previously Published under the Title: Maritime English Journal)

The Development and Validation of a Scale on English for Research Publication Purposes (ERPP) in EAP Context

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Research Paper IJEAP- 2210-1920 DOR: 20.1001.1.24763187.2022.11.4.6.3
Received: 2022-10-31 Accepted: 2022-12-30 Published: 2022-12-31

Abstract: The present research aimed to conceptualize the construct of ERPP by designing and validating a questionnaire in the Iranian EAP (English for Academic Purposes) context. In so doing, a tentative scale with 60 items was piloted on 100 experienced Iranian EAP teachers. The results of the analyses, using Exploratory and Confirmatory Factor Analysis (EFA, CFA), led to the discovery of 37 items on a five-point Likert scale. Moreover, the results revealed that the construct of ERPP has 12 factors including "grammatical errors", "proofreading", "the quality of the English writing", "supporting non-native English writers", "sounding like a native English writer", "the importance of the editors and reviewers to be native English speakers", "advantages of using English as a professional language", "English grammar and vocabulary", "English genres and discourse", "English research article structure and style", "English journal submission and revision processes", and "time requirements for article writing and revision". Likewise, the convergent validity and reliability of the instrument to measure the construct of concern was statistically confirmed (CR>0.7; p>.05). The findings have various implications for ERPP teachers, teacher trainers, course designers, and language researchers by raising their awareness of ERPP and its underlying components. In particular, EAP instructors can employ various resources to promote the students' awareness of how to get their papers published. Likewise, by taking part in ERPP courses and becoming familiar with the publishing practices and criteria, the students can enhance their academic authorship skills.

Keywords: EAP teachers, English for Research Publication Purposes (ERPP), questionnaire design, questionnaire validation

Introduction

Nowadays, scholars feel the need to publish more research papers internationally. This need is based on several reasons. One of the reasons is that scholars want the world to see their work, increase the visibility of their research, and become aware of their research results. The second reason is that scholars can be recognized internationally, and they can connect to each other and extend their research network. The other reason for the need to publish internationally is to promote academically and gain professional benefits like getting research funds and a raise in salary and income (Burgess et al., 2014; Hanauer & Englander, 2011; Lillis & Curry, 2010; Martín et al., 2014).

In different disciplinary areas, most scientific journals publish in English and the number of scientific journals in other languages has decreased extensively. Therefore, English has dominated the world of science and research and scholars around the world are required to read and write English research papers. The indexes that top-tier journals have, like Scopus and web of science to measure knowledge and

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rank different journals, mostly revolve around journals publishing in English which caused English to be the language of science. Another problem faced by research writers, especially the inexperienced ones, is their difficulties in writing a research paper. Scholars should follow certain rules and conventions so that their works can be accepted internationally and by the editors and reviewers in international English language journals.

There is a need for scholars to master the established rhetorical conventions in different research genres like the research article (RA). ERPP attempts to support scholars to help them publish their research papers and get recognized in the world of science. ERPP helps scholars to be able to analyze the structural organization of their RAs. It provides information regarding both the macro- and micro-structure of the RAs (Martin & Leon Perez, 2017). Publishing in English language and international journals requires the scholars to be a member of a wider discourse community, which needs a high level of expertise in the disciplines, having common aims, and being able to use specific genres and terminologies to exchange information (Swales, 1990). The style of writing an English RA is clear and well-specific. This style depends on specific disciplines, and it could be a little different based on which journals the scholars intend to write to and publish their RAs (Farley, 2018).

Hence, writing and publishing in English language journals could be a challenge for scholars whose first language is not English. For many decades, the pressure to write English RAs has been a challenge for non-native English speaking (NNES) academics in different countries and disciplines (Duszak & Lewkuwicz, 2008; Flowerdew, 1999; Ge, 2015; Uzuner, 2008). This pressure and the difficulties of writing and publishing in Scopus-listed English language journals could be an obstacle for NNES scholars to get promotion in their field of study. More importantly, English-language scholars have more chances in publishing their RAs, and non-native scholars should try to deal with the unequal world of publishing by raising their awareness regarding different genres, rules, and strategies to write English RAs.

As a solution, EAP teachers and students should become familiar with academic publication and get help regarding writing an acceptable RA. One way to do so is to become familiar with the research principles, genres, and components by comparing native speakers' RAs with those of non-native ones. In this way, they can identify the barriers and obstacles that might cause their RAs not to be accepted and published in international English journals (Farley, 2018). Most of the studies conducted on ERPP have mainly concentrated on the paper publication process and strategies (e.g., Bardi, 2015; Luo & Hyland, 2016; McDowell & Liardet, 2019; teaching ERPP (Li et al., 2018; Li et al., 2019) and language-related requirements in ERPP (Farley, 2018; Mcinley & Rose, 2018) and, to the best the researchers' knowledge, developing a multidimensional scale to measure the teachers' perceptions of ERPP and determine its underlying constructs in EAP context has not been examined. To deal with the shortcomings, the current study attempted to develop and validate a questionnaire on ERPP for teachers in Iranian EAP context.

Literature Review

When multilingual scholars try to publish their articles in English-language journals, they face different problems or burdens. Flowerdew (1999) in his analysis of Chinese scholars in Hong Kong has identified some of these problems; "they have less facility of expression; it takes them longer to write; they have a less rich vocabulary; they find it difficult to make claims for their research with the appropriate amount of force; their process of composition may be influenced by their L1; and they are restricted to a simple style" (p. 243). Other studies have shown that multilingual scholars in EFL contexts experience more problems than multilingual scholars in ESL contexts (Cho, 2009). ERPP researchers try to investigate these problems to find relevant and proper solutions. Multilingual scholars face "linguistic injustice", because editors and reviewer usually favor Native-English speakers, and speakers of other languages have less chance to publish their articles (Politzer-Ahles et al., 2016). However, Hyland (2016) talks about "disadvantage orthodoxy", and by this expression he means that multilingual scholars just consider prejudice and they do not attempt

to revise their work; and the difficulties Native-English speakers encounter in publishing their work are ignored.

Statistics shows that English is the language of research and academic publication around the world (e.g. Ferguson, 2007; Swales, 2004). Researchers in different disciplines need to publish their articles in English. It is a high pressure on these researchers. Hard science disciplines use English more for their publications because these majors are more universal than humanities and social sciences (Flowerdew & Li, 2009). Journal publishers recommend using an editing or language polishing service to deal with variations in different articles. In addition to language proficiency, different competences like research planning and design, choosing appropriate methodological tools, writing critically, knowing the rhetoric, and continuous practicing of research writing are needed for the researchers to be able to write and publish in English (Bardi, 2015). As the number of researchers submitting their papers to English journals increases, the work of editors and reviewers become more difficult because they face new ranges of lexico-grammatical, socio-pragmatic, and discoursal dimensions (Cargill & Burgess, 2008).

There are three important factors involved in ERPP: Multilingual authors, publishable texts, and journal practices. The first factor, multilingual authors, considers the authors' disciplinary homes, their first culture, and the national, institutional, and personal goals of their work. The journal practices include issues of standardization, standards and requirements, and access to the published work. The other factor, publishable texts, considers pedagogy, approaches and activities, and the author's editing (Matarese, 2013). These different factors are interrelated. Hyland (2016) believes that English syntax, lexis, and discourse would be difficult for non-English researchers to be properly used, and publishing in English is not fair for these researchers who use English as an Additional Language (EAL).

EAL authors feel that English has influenced their academic lives to a great extent (Curry & Lillis, 2004; Flowerdew, 1999; Giannoni, 2008), and they are aware of the dominance of English in the publishing world. They think that having competence in English is necessary for publishing in English language journals. They believe that writing in English is more difficult than writing in their L1. Different studies have shown that the burden EAL researchers feel writing RAs in English as an L2 is 24% greater than the burden they perceive writing RAs in their L1 (Moreno et al., 2012). Having high level of proficiency in English, especially in writing, as L2 in general or academic fields in particular decreases the amount of perceived difficulty writing in English for EAL researchers (Moreno et al., 2012).

The main obstacles that EAP learners encounter in managing the publication process will be the facilities and funding they receive. Having a consultant or mentor to help students with their language and publication problems could increase the chance of successful publications. International experts are also needed to help students with their language and publication problems. Specific training and workshops are required for the learners of specific disciplines. Higher English proficiency in reading and writing is a necessary element in writing for international journals. Trained ERPP teachers can provide more accurate English instruction on scientific paper writing and publication. Academic reading and writing, English grammar, and the structure and design of English articles are areas which should be taught and practiced (Cargill, 2015). Writing articles in EAL needs more time and effort from scholars, and it is an extra burden on them to write and edit their English articles (Ferguson et al., 2011; Flowerdew, 1999). Scholars working in a teaching institute experience greater burden than the ones working in a research institute (Hanauer & Englander, 2013).

Hanauer and Englander (2013) suggested two educational interventions to prepare students to write English articles: Explicit teaching and mentoring programs. Thesis or dissertation supervisor can play the role of a mentor to help students write their articles and publish them for the first time (Lei & Hu, 2015). A combination of genre-analytic and corpus linguistics approaches could be also effective for teaching and mentoring research article writing (Burgess & Cargill, 2013). All in all, multilingual authors have to revise their manuscripts based on the expectations of English language journals (Moreno et al., 2012). Lexico-

grammatical accuracy, clarity, genre and linguistic transfer are among discursive challenges which are related to the lack of L1 proficiency in writing. The non-discursive challenges consist of having no opportunity to publish in English, inadequate time, not meeting the publication expectations, going through the submission and review process, and not getting support from the context to publish English papers. Hence, multilingual authors need professional copy editing, proofreading, and input from collogues and friends who can help them reach the final product. By reading English academic texts and mastering their linguistic and meta-linguistic features, multilingual scholars can better prepare themselves to publish in English-language journals (McDowell & Liardet, 2019).

ERPP area of research and inquiry is still in its nascent stage and requires more empirical evidence. Driven by this scarcity of research on ERPP and the need for a multidimensional and validated questionnaire to disclose its underlying factors, the current study sought to develop and validate a scale conducive for the measurement of teachers' views and perceptions of ERPP and its miscellaneous dimensions in EAP context. To pursue the research purposes, the following research question was posed in this study.

Research Question: What are the underlying components and psychometric properties of ERPP questionnaire?

Method

Participants

The main participants of the present study were 100 EAP instructors involved in hard science majors, including electrical (20%), mechanical (30%), civil (15%), and computer engineering (35%), for a large-scale survey from different universities in Iran. They were selected based on their willingness to participate in the study and snowball sampling, which is used when the first participants in a study suggest some other people who will be appropriate for the research (Dörnyei, 2012). These participants can suggest others, and this sampling is used when the participants are not in one place (Ary et al., 2014). As for the participants' age, 12.5% of the participants were 36 years old and the rest of them were between 25 to 50 years old. These participants had certain features like being both male (45%) and female (55%), teaching hard science majors, and having the experience of publishing in English language journals. Most of them (58.5%) had a master's degree (MA), 19.5% were PhD students, and the rest were professors.

Most participants (90.7%) were TEFL instructors (Teaching English as a Foreign Language) and the rest of them (9.3%) had non-TEFL majors. Regarding the level of teaching experience, 14% of the participants had ten years of experience, 9.3% had 22 years of experience, 11.6% had 4 years of experience, and the rest of them had 5 to 22 years of experience teaching in their field. Regarding their professional experiences, 20% of the participants have been working in their fields for 8 years, 12.5% have been working for 10 years, and the rest of them had 8 to 30 years of experience working in their field.

Instruments

Following Dörnyei and Taguchi's (2010) model of questionnaire development, the researchers of the current study developed and validated a scale on ERPP by collecting the data from 100 EAP teachers. In the process of scale development, five TEFL experts were interviewed and some of the questionnaire items were extracted from their remarks. As a leading model in this study, some other items chosen for this study were taken from a study in Japan by McDowell and Liardet (2019). The questionnaire items were based on earlier works in the domain of ERPP (Ferguson et al., 2011; Flowerdew, 1999; Li, 2002), which focus on four key areas: The research writing process, benefits and burdens of using English as a professional language, publishing experiences, and perceptions of errors. The developed questionnaire entailed 82

questions: Section one consisted of 7 questions to gather demographic information about the participants of the study like name, age, gender, current position and academic status, major , and their level of teaching experience; section two included 9 questions asking about professional information of the participants; section three consisted of 6 questions to gather information about the writing strategies that the participants use to write a scientific article; section four included 35 Likert scale questions about the participants' perceptions of English for research and publication purposes; and finally section five embodied 25 questions about the challenges of English academic writing. It is worthy of note that the first three sections provided the demographic and background information of the participants; however, the last two sections concentrated on the participants' perceptions of ERPP. The required time for the completion of this questionnaire was between 20 to 30 minutes.

Data Collection Procedure

The primary version of the questionnaire was piloted with the help of 43 EAP teachers and professors from different universities in Kermanshah and Tehran, Iran. In addition, based on the expert judgement approach, some corrections were made in the wording and arrangement of items. After ensuring the reliability and content validity of the questionnaire, the final version of the questionnaire was administered completely online because of the Covid 19 pandemic to 100 EAP participants (55% of the participants were female and 45% were male). The Google docs form was used to write and administer the questionnaire. It was administered by using emails and WhatsApp and telegram applications. In the questionnaire, the key-words have been highlighted in bold to emphasize the key concepts and reduce the participants' cognitive load.

Data Analysis

To analyze the collected data of this study, EFA and CFA were employed to determine the construct validity and strength of the relationship in the questionnaire items. Through EFA, the underlying factors were explored to reduce the dimensions and extract the relevant factors. Similarly, the precision of the measurement of the structures was examined by the relevant indices. In this phase, CFA specifies whether or not the designed items can actually measure what they claim to measure. Likewise, the relevance of the extracted factors to the variables and factors was determined. To calculate the reliability and validity of the two main parts of the questionnaire, representing the participants' perceptions of ERPP (with 35 and 25 items, respectively), they were distributed among 100 EAP participants. Exploratory and Confirmatory Factor Analyses were performed using SPSS software (Version 21). Path analysis was conducted to measure the model fitness indices and convergent validity.

Results

Exploratory Factor Analysis for the First part of the Questionnaire

Factor analysis is a multi-variable method which is used for dimension reduction, as this method reduces a large number of variables to smaller numbers which is called components. Factor analysis is done either through exploratory or confirmatory method. Exploratory factor Analysis is used to study the hidden dimensions (components) of the variable. The researcher reduces the number of variables to a few components. Each component includes some items. The extracted factors are good indicators for explaining the subject or phenomenon under study. In exploratory factor analysis, the researcher identifies how many components can be extracted from the gathered data of the variable. However, confirmatory factor analysis is often used to test the hypothesis when the researcher has enough evidence to apply the components and items based on the theoretical frameworks. In summary, exploratory factor analysis is a method that is often used to detect and measure the sources of diffraction in the observed measurements.

An 82-item questionnaire was developed to capture the participants' perceptions of English for research and publication purposes. The obtained results were analyzed through factor analysis to ensure its construct validity. To measure EFA for the first part of the questionnaire including 35 items, SPSS software was used. The results are as the following:

Table 1

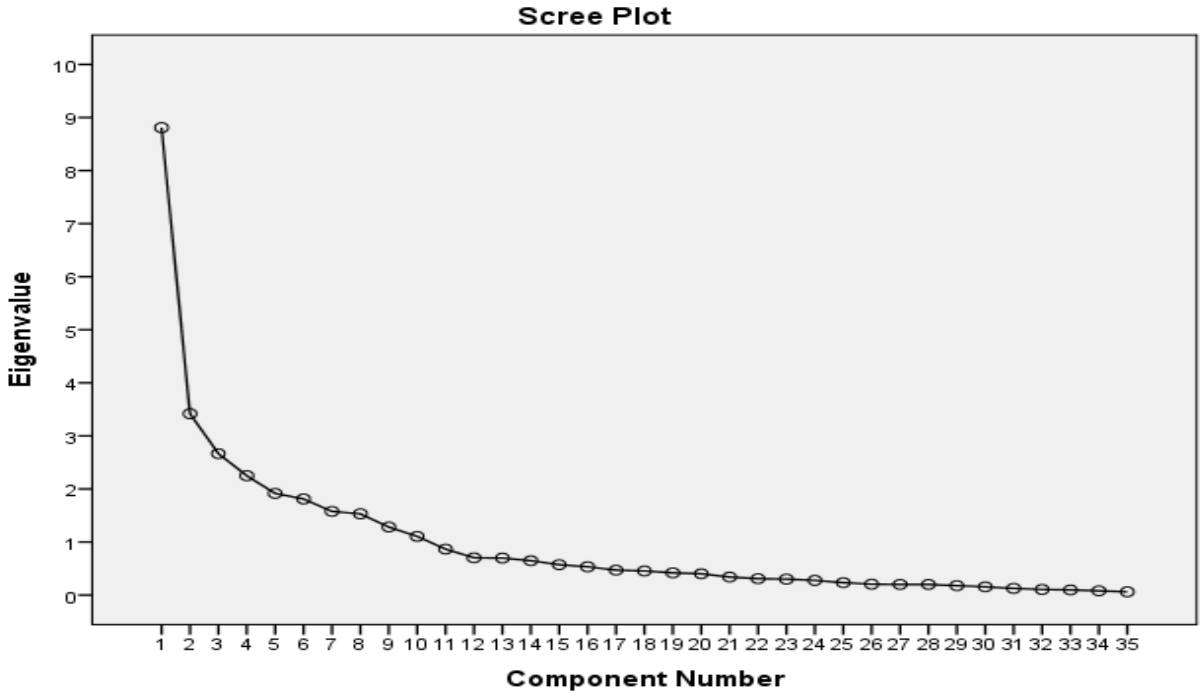
KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.724
Bartlett's Test of Sphericity	Approx. Chi-Square	2133.343
	df	595
	Sig.	.000

As shown in Table 1, the number of participants proved to be satisfactory enough (KMO=.724). Likewise, the significance level of Bartlett sphericity test was less than 0.05 which indicates that there is a significant relationship between items in the correlation matrix, and as a result, it is possible to identify new factors in exploratory factor analysis.

Figure 1

Scree Plot for the First Part of ERPP Questionnaire



This scree plot shows that the first seven factors account for most of the total variability in data (given by the eigenvalues). The eigenvalues for the first seven factors are all greater than 1. The remaining factors account for a very small proportion of the variability and are likely unimportant.

Table 2

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8.809	25.168	25.168	8.809	25.168	25.168	4.003	11.437	11.437
2	3.418	9.765	34.934	3.418	9.765	34.934	3.605	10.301	21.737
3	2.665	7.613	42.547	2.665	7.613	42.547	3.407	9.735	31.472
4	2.250	6.427	48.974	2.250	6.427	48.974	3.089	8.825	40.298
5	1.915	5.472	54.446	1.915	5.472	54.446	2.985	8.529	48.826
6	1.811	5.175	59.620	1.811	5.175	59.620	2.789	7.970	56.796
7	1.577	4.507	64.127	1.577	4.507	64.127	2.566	7.331	64.127
8	1.531	4.375	68.502						
9	1.283	3.666	72.168						
10	1.106	3.159	75.327						
11	.866	2.474	77.801						
12	.702	2.006	79.807						
13	.697	1.991	81.798						
14	.648	1.853	83.651						
15	.573	1.636	85.287						
16	.533	1.523	86.809						
17	.470	1.342	88.151						
18	.455	1.299	89.450						
19	.419	1.198	90.648						
20	.402	1.149	91.797						
21	.339	.969	92.766						
22	.309	.883	93.649						
23	.301	.860	94.509						
24	.277	.791	95.300						
25	.235	.670	95.971						
26	.205	.587	96.557						
27	.201	.574	97.131						
28	.200	.571	97.702						
29	.177	.507	98.209						
30	.156	.445	98.654						
31	.126	.360	99.014						
32	.106	.302	99.316						
33	.097	.277	99.593						
34	.080	.230	99.823						
35	.062	.177	100.000						

As the Table 2 revealed, seven factors were explored having indices more than 1 in the total column. This was high enough to let them remain and be considered as reliable factors in the next stages of data analysis. Moreover, the cumulative variance of the extraction loadings indicated that these factors could explain the variance of the variables to 64.1 percent.

Table 3

Rotated Component Matrix

	Component						
	1	2	3	4	5	6	7
q1							
q2						.885	
q3			.749				
q4			.517				
q5			.668				
q6	.589						
q7			.526			.512	
q8						.861	
q9			.662				
q10							.687
q11							.844
q12							.761
q13				.599			
q14					.662		
q15					.786		
q16					.869		
q17					.830		
q18	.801						
q19	.723						
q20	.654	.477					
q21	.510	.646					
q22		.748					
q23		.530	.574				
q24				.654			
q25		.799					
q26		.662					
q27				.715			
q28	.453	.509					
q29	.570						
q30	.570						
q31			.415	.566			
q32						.750	
q33							
q34			.546	.421			
q35				.733			

As seen in Table 3, the factor loadings of the questions are all higher than 0.4, thus the items can be classified into 7 factors. Based on the rotated component matrix, the basis for classifying questions into factors is confirmed based on the theoretical model of the questionnaire, and all questions (observed variables) in their respective factor (structure or latent variable) are correctly categorized. After the exploratory factor analysis, confirmatory factor analysis was performed using Amos software (Version 21) whose results are presented in the subsequent sections.

EFA for the Second part of the Questionnaire

To measure EFA for the second part of the questionnaire, including 25 items, SPSS software was used. The results are as the following:

Table 4

KMO and Bartlett's Test

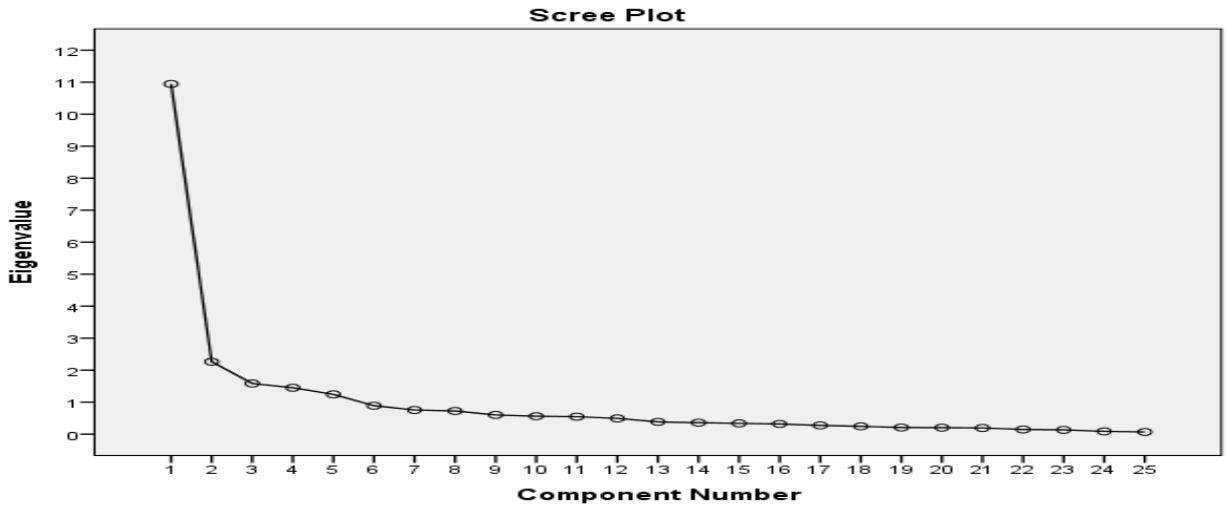
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.692
Bartlett's Test of Sphericity	Approx. Chi-Square	2131.251
	df	595
	Sig.	.000

As shown in Table 4, the number of the participants proved to be satisfactory enough (KMO=.692). Likewise, the significance level of Bartlett sphericity test was less than 0.05 which indicates that there is a

significant relationship between items in the correlation matrix, and as a result, it is possible to identify new factors in exploratory factor analysis.

Figure 2

Scree Plot for the Second Part of ERPP Questionnaire



This scree plot shows that the first five factors account for most of the total variability in data (given by the eigenvalues). The eigenvalues for the first five factors are all greater than 1. The remaining factors account for a very small proportion of the variability and are likely unimportant. The following table (Table 5) shows the percentage of total variance explained before and after rotation. The higher percentage of cumulative variance extracted after rotation shows that the factors can strongly explain the variance of the questionnaire variables.

Table 5

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	10.945	43.780	43.780	10.945	43.780	43.780	4.382	17.529	17.529
2	2.263	9.052	52.832	2.263	9.052	52.832	3.705	14.819	32.348
3	1.584	6.335	59.167	1.584	6.335	59.167	3.460	13.842	46.190
4	1.450	5.800	64.968	1.450	5.800	64.968	3.167	12.668	58.858
5	1.243	4.971	69.939	1.243	4.971	69.939	2.770	11.081	69.939
6	.889	3.555	73.494						
7	.754	3.018	76.512						
8	.724	2.897	79.409						
9	.600	2.398	81.807						
10	.561	2.244	84.051						
11	.545	2.181	86.232						
12	.492	1.969	88.201						
13	.384	1.537	89.738						
14	.358	1.431	91.168						
15	.336	1.344	92.512						
16	.319	1.276	93.788						
17	.272	1.086	94.874						
18	.243	.972	95.845						
19	.208	.833	96.678						
20	.203	.812	97.490						
21	.193	.772	98.262						
22	.147	.586	98.848						
23	.133	.533	99.381						
24	.086	.344	99.725						
25	.069	.275	100.000						

As the table revealed, five factors were explored having indices more than 1 in the total column. This was high enough to let them remain and be considered as reliable factors in the next stages of data analysis. Moreover, the cumulative variance of the extraction loadings indicated that these factors could explain the variance of the variables to 69.9 percent.

Table 6

Rotated Component Matrix

	Component				
	1	2	3	4	5
q36		.575			
q37		.785			
q38		.708			
q39					.710
q40					.667
q41	.543	.497			
q42	.695				
q43			.631		
q44			.713		
q45			.777		
q46					.808
q47		.486			.555
q48			.588		
q49			.692		
q50				.776	
q51				.816	
q52				.635	
q53				.680	
q54		.607			
q55		.618			
q56		.521			
q57	.697				
q58	.804				
q59	.817				
q60	.833				

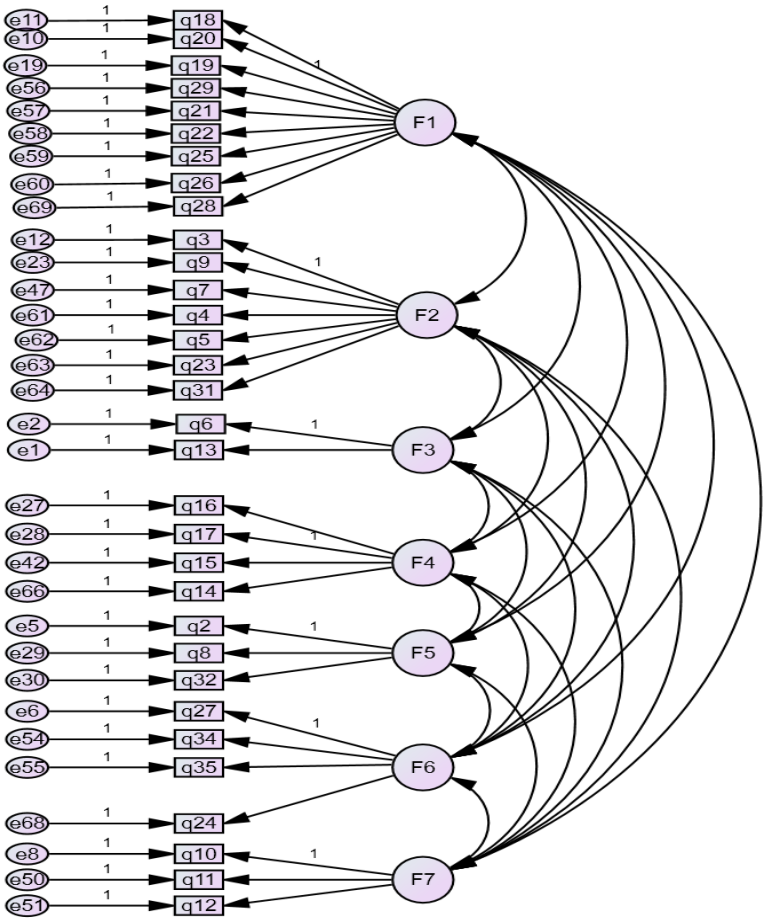
As seen in Table 6, the factor loadings of the questions are all higher than 0.4; thus, the items can be classified into five factors. Based on the rotated component matrix, the basis for classifying the questions into factors is confirmed based on the theoretical model of the questionnaire, and all questions (observed variables) in their respective factor (structure or latent variable) are correctly categorized. After the exploratory factor analysis, confirmatory factor analysis was performed using Amos software.

Confirmatory Path Analysis for the First Part of the Questionnaire

At first, a model based on the components and the devoted items to each component, according to EFA phase, was drawn in AMOS software. As seen in the following figure, seven components were connected by the covariance paths to measure the relationships among the extracted components.

Figure 3

Standardized Estimates of the Initial Model for the First Part of the Questionnaire

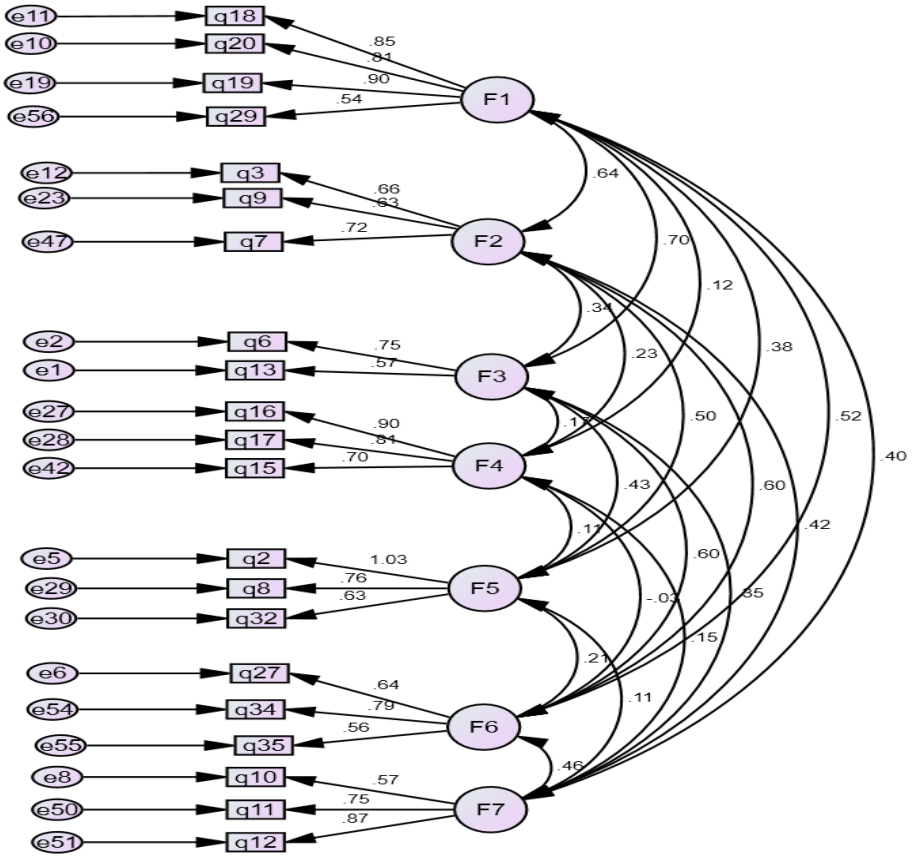


After running the model, items with factor loading lower than 0.5 were removed from the model. If the model fit indices are satisfying, some weak items (with the lowest factor load compared to other items in the model) are removed. The process of removing weak items continues to the point where the fit indices and the average variance extracted (AVE) and composite reliability (CR) become satisfactory.

If the fit indices are at the desired level, there is no need to modify the model, but if the indicators are not in the desired range, corrections should be made. The first correction is to remove the items with a factor load of less than 0.5. In the model of this study, some factor loads less than 0.5 were obtained, so items with a factor load of less than 0.5 were removed from the model. However, the fit indices were not satisfying. Therefore, by drawing the covariance paths between the item errors based on the suggestions of the Modification Indices table in the output of Amos, the fit indices were as follows:

Figure 4

The initial model of confirmatory factor analysis for the factors 1-7



The graph above is the final model after confirmatory path analysis, and the model fit indices are as follows:

Table 7

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	63	250.282	168	0	1.49
Saturated model	231	0	0		
Independence model	21	1109.331	210	0	5.283

Table 8

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	0.774	0.718	0.913	0.906	0.909
Saturated model	1		1		1
Independence model	0	0	0	0	0

Table 9

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	0.07	0.051	0.088	0.04
Independence model	0.208	0.196	0.22	0

In general, if the chi-square index divided by the degree of freedom (Cmin / df) is less than 3 (Table 7) and the RMSEA index (Table 9) is less than 0.08 (between 0.08 and 1 is also acceptable at the average level) and three indices of the total index If the adaptive fit values are greater than 0.9, the desired model fit indices are obtained (Table 8). Thus, the indicators of confirmatory factor analysis (first order) were obtained to the desired level and the model was approved. After evaluating the fitness of the model, it is time for measuring the validity of the model. Convergent validity is confirmed if the composite reliability is greater than 0.7, and the mean extracted variance is greater than 0.5.

Table 10

Composite Reliability and Convergent Validity of CFA for the First Part of the Questionnaire

CR	AVE	Observe Variable		Latent variable	Estimate
0.672148	0.624	Q20	⟵	F1	0.814
		Q18	⟵	F1	0.851
		Q19	⟵	F1	0.903
		Q29	⟵	F1	0.543
0.762	0.528	Q3	⟵	F2	0.664
		Q9	⟵	F2	0.627
		Q7	⟵	F2	0.724
0.726	0.517	Q13	⟵	F3	0.565
		Q6	⟵	F3	0.746
0.75	0.649	Q16	⟵	F4	0.9
		Q17	⟵	F4	0.807
		Q15	⟵	F4	0.699
0.74	0.512	Q2	⟵	F5	1
		Q8	⟵	F5	0.765
		Q32	⟵	F5	0.627
0.756	0.508	Q27	⟵	F6	0.644
		Q34	⟵	F6	0.785
		Q35	⟵	F6	0.562
0.704	0.51	Q10	⟵	F7	0.569
		Q11	⟵	F7	0.749

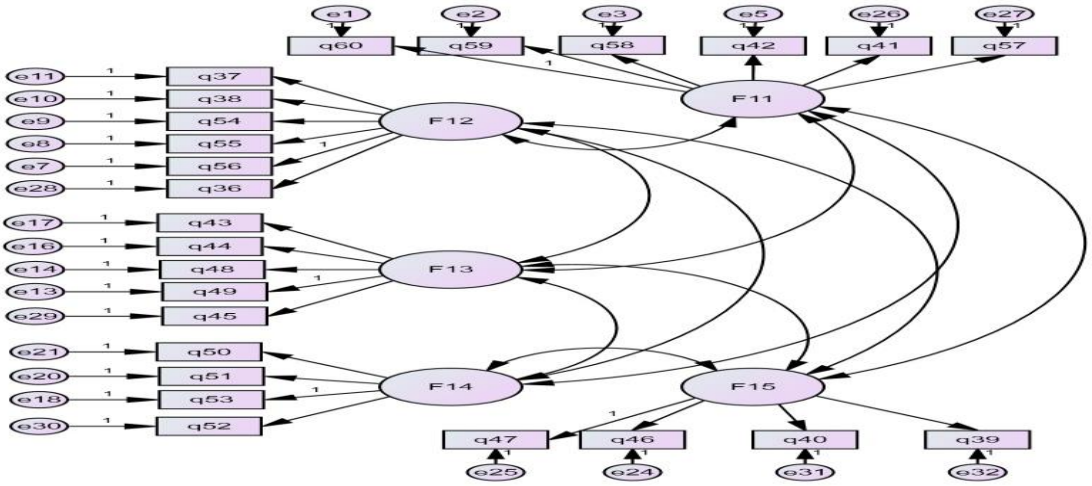
As shown in Table 10, since the CR value is greater than 0.7 for both factors, the AVE value is greater than 0.5 and CR> AVE, convergent validity is confirmed.

Confirmatory Path Analysis for the Second Part of the Questionnaire

At first, a model based on the components and the devoted items to each component, according to EFA phase, was drawn in AMOS software. As seen in the following figure, five components were connected by the covariance paths to measure the relationships among the extracted components.

Figure 5

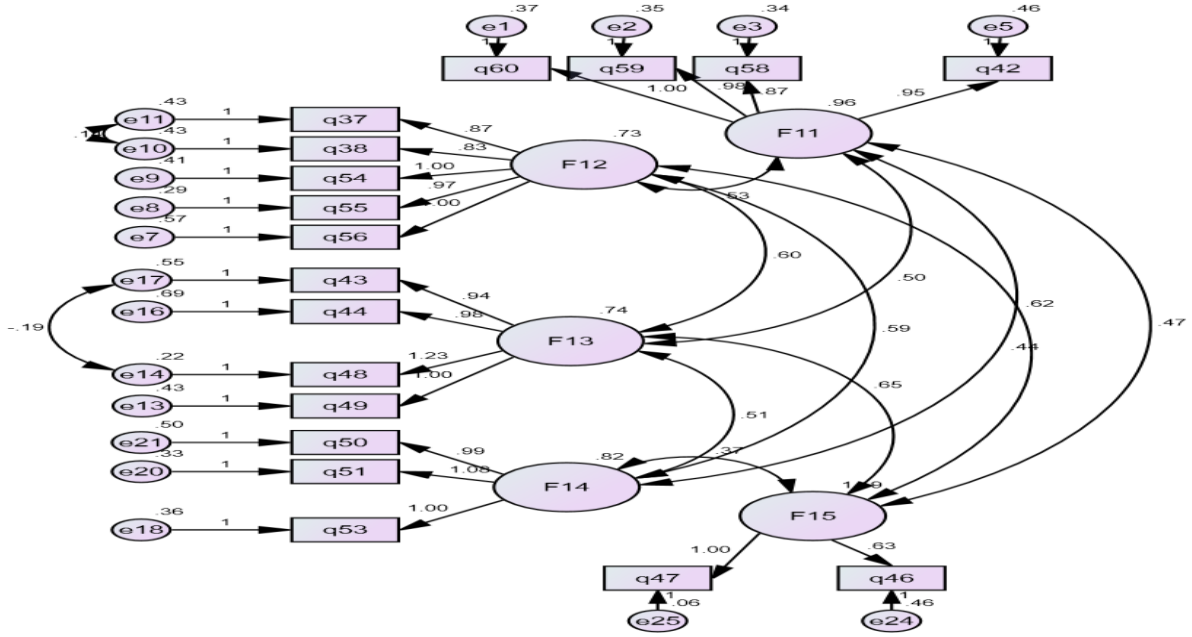
Standardized Estimates of the Initial Model for the Second Part of the Questionnaire



After running the model, items with factor loading lower than 0.5 were removed from the model. Moreover, if the model fit indices are satisfying, some weak items (with the lowest factor load compared to other items in the model) are removed. The process of removing weak items continues to the point where the fit indices and AVE and CR become satisfactory.

Figure 6

Final Model of Confirmatory Factor Analysis for the Factors 11-15



In the following Tables (Table 11 to 13), the fit indices of CFA are shown.

Table 11

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	48	218.885	123	0	1.78
Saturated model	171	0	0		
Independence model	18	1365.331	153	0	8.924

Table 12

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	0.84	0.801	0.923	0.902	0.921
Saturated model	1		1		1
Independence model	0	0	0	0	0

Table 13

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	0.089	0.069	0.108	0.001
Independence model	0.283	0.269	0.297	0

In general, if the chi-square index divided by the degree of freedom (Cmin / df) is less than 3 and the RMSEA index is less than 0.08 (between 0.08 and 1 is also acceptable at the average level) and three indices of the total index of the adaptive fit values are greater than 0.9, the desired model fit indices are obtained. Thus, the indicators of confirmatory factor analysis (first order) were obtained to the desired level and the model is approved. After evaluating the fitness of the model, it is time for measuring the validity of the model. Convergent validity is confirmed if the composite reliability is greater than 0.7, and the mean extracted variance is greater than 0.5.

Table 14

Composite Reliability and Convergent Validity of CFA for the First Part

CR	AVE	Observe Variable		Latent variable	Estimate
0.812	0.693	Q60	⬅	F11	0.848
		Q59	⬅	F11	0.856
		Q58	⬅	F11	0.824
		Q42	⬅	F11	0.807
0.834	0.602	Q56	⬅	F12	0.749
		Q55	⬅	F12	0.841
		Q54	⬅	F12	0.799
		Q38	⬅	F12	0.734
		Q37	⬅	F12	0.751
0.804	0.628	Q49	⬅	F13	0.794
		Q48	⬅	F13	0.914
		Q44	⬅	F13	0.711
		Q43	⬅	F13	0.736

0.763	0.685	Q53	⟸	F14	0.832
		Q51	⟸	F14	0.862
		Q50	⟸	F14	0.788
0.702	0.727	Q46	⟸	F15	0.707
		Q47	⟸	F15	0.977

As shown in Table 14, since the CR value is greater than 0.7 for both factors, the AVE value is greater than 0.5 and also CR> AVE, convergent validity is confirmed.

Measuring the Reliability of the Instrument

The criterion for assessing reliability is the internal consistency of the items. One of the methods used to measure the reliability of structural equation modeling is the internal consistency of measurement models. The high value of variance explained between the model and its indices results in high internal consistency against the measurement error of each index. A Cronbach's alpha value above 0.7 indicates acceptable reliability. For variables with a small number of questions, the value of 0.6 has been introduced as the optimal limit of Cronbach's alpha coefficient.

Table 15

Cronbach's Alpha for the Factors 1-7

Cronbach's alpha	items	Number of items	factor
0.858	18, 19, 20, 29	4	F1
0.715	3, 7, 9	3	F2
0.703	6, 13	2	F3
0.833	15, 16, 17	3	F4
0.850	2, 8, 32	3	F5
0.708	27, 34, 35	3	F6
0.779	10, 11, 12	3	F7
0.852		21	All items

Table 16

Cronbach's Alpha for the Factors 11-15

Cronbach's alpha	items	Number of items	factor
0.900	42,58,59,60	4	F11
0.886	37,38,54,55,56	5	F12
0.753	43,44	2	F13
0.865	50,51,53	3	F14
0.812	46,47	2	F15
0.927		16	All items

As shown in the tables above (Table 15 and Table 16), the alpha indices for the total items (questionnaire) and its components are above 0.7, thus the reliability is confirmed.

Discussion

All authors and scientific researchers feel the need to publish their research findings in accredited top-tier English journals for the following two reasons: First, English is an international language and is viewed as the main language of science; and second, publishing research findings constitutes an inevitable part of a researcher's professional life. The purpose of the current study was to develop and validate an ERPP scale and identify the underlying constructs of ERPP. Using EFA, CFA, and SEM to analyze the data, this study was carried out in Iranian EAP context. It mainly attempted to narrow the theory-practice gap in ERPP by proposing and validating an ERPP questionnaire. To determine the main factors and condense the data, EFA was run.

To check and confirm the appropriateness of the collected data, before initiating factor analysis, the Bartlett and KMO tests were used. The results of Bartlett's Test of sphericity as well as the KMO were significant and approved the sample adequacy. Subsequently, 12 factors were extracted with eigenvalues above 1, via Principle Component Analysis (PCA), accounting for 64.1% and 69.9% of the total variances. With 12 factors being approved through EFA, using a covariance-based software (i.e., IBM SPSS AMOS 21), the remaining items went through a CFA by SEM. The model modifications analyses evinced that the extracted factors and the remained items were both reliable and valid. Likewise, the measurement models were approved through the fitting indices. They all confirmed the external validity of the model.

The 12 factors or components of the scale in this study included the "grammatical errors", "proofreading", "the quality of the English writing", "supporting non-native English writers", "sounding like a native English writer", "the importance of the editors and reviewers to be native English speakers", "advantages of using English as a professional language", "English grammar and vocabulary", "English genres and discourse", "English research article structure and style", "English journal submission and revision processes", and "time requirements for article writing and revision". The results are consistent with those of Canagarajah (2002), Cho (2009), Flowerdew (2013), Li (2006, 2007), Lillis and Curry (2010), and Salager-Meyer (2008). Bardi (2015) believes that in addition to language proficiency, different competences regarding research planning and design, choosing appropriate methodological tools, writing critically, knowing the rhetoric, and continuous practicing of research writing are needed for the researchers to be able to write and publish in English. This study also confirms the factors that Hyland (2016) mentioned in his study in that English syntax, lexis, and discourse would be difficult for non-English researchers and publishing in English is not fair to these researchers who use EAL.

One possible justification for the research findings could be the fact that the extant questionnaires (e.g., McDowell & Liardet, 2019, adapted from Ferguson et al., 2011; Flowerdew, 1999; Li, 2002) have not covered all aspects of ERPP and just focused on four key components of: The research writing process, benefits and burdens of using English as a professional language, publishing experiences, and perceptions of errors. Another justification for the findings would be the Iranian EAP context in which the participants direct their academic publications. Lexico-grammatical accuracy, clarity, genre and linguistic transfer are among discursive challenges which are related to the lack of L1 proficiency in writing. The non-discursive challenges consist of having no opportunity to publish in English, inadequate time, not meeting the publication expectations, going through the submission and review process, and not getting support from the context to publish articles in English. The extracted factors in this study show the significance of theses linguistic and non-linguistic challenges that EAP scholars face in writing scientific English papers.

Consistent with Giraldo (2019)'s study, the present study showed that time plays an important role in ERPP. The student participants in his study found the overall language proficiency and time as very important factors contributing to the possibility of writing publishable English papers. In the same vein, Giraldo (2019) maintains that language awareness is one of the essential requirements for writing publishable research papers. The present study also lends support to Manchon's (2016) conclusion

regarding the important role of grammar in writing publishable research papers. He asserts that writing publishable research papers requires the knowledge of how to write correctly, i.e., using grammar. Hence, the lack of adequate language proficiency is one of the main Achilles' heels non-native writers grapple with. Similarly, Giraldo (2019) argues that authors whose first language is not English are required to enhance their English writing skills to share their knowledge. These authors would feel disadvantaged due to their perceived weak English proficiency. To better represent the participants' perceptions on ERPP, the developed questionnaire in the current study had items pertaining to all these influential factors.

The results of this study are also line with a study conducted by Morton, Storch, and Thompson (2015), who showed that the support writers receive plays an important role in academic writing. The participants of their study acknowledged that the positive feedback and support they received from others increased their confidence, which, in turn, led to better products. Following Hyland's (2016) study, revealing that academic writing courses contributed to the learners' awareness of the moves required for writing a research paper, some of the questionnaire items concentrated on the significant role of discourse and genre analysis for research papers publication. All in all, in the present study, the socio-cultural and historical context of Iran with its ups and downs might have affected the participants' views regarding paper publication.

Conclusion and Implications

The use of English as a Lingua Franca (ELF) in scientific discourse affects the transference and production of scientific knowledge. Non-native authors and researchers are increasingly using English as a means to share their scientific knowledge and findings in international journals (i.e., they resort to English for purposes other than communication). This study attempted to specify the different factors or components involved in the writers' perceptions of ERPP by designing and validating a questionnaire in Iranian EAP context. The research results, using EFA and CFA, evinced that the construct of ERPP consists of 12 factors, entailing "grammatical errors", "proofreading", "the quality of the English writing", "supporting non-native English writers", "sounding like a native English writer", "the importance of the editors and reviewers to be native English speakers", "advantages of using English as a professional language", "English grammar and vocabulary", "English genres and discourse", "English research article structure and style", " English journal submission and revision processes", and "time requirements for article writing and revision". Using composite reliability and convergence validity, the questionnaire was found both reliable and valid.

This empirical study, which sought to develop and validate an ERPP questionnaire, has both theoretical and pedagogical implications. From theoretical perspectives, the findings of this study can expand the growing body of research on ERPP. Moreover, this study can extend the literature related to ERPP research in general and EAP context in particular. Pedagogically, the research results would assist ERPP and EAP teachers, teacher educators, and researchers in different ways. As for the teachers, the results can enhance their awareness of ERPP and its underlying constructs. EAP instructors can raise the students' awareness and knowledge of the different rhetorical strategies used by the members of a research community that deal with a specific field, the criteria and formats accepted by different journals, and the various steps they need to take to publish their papers. Likewise, teacher educators can take advantage of the results to specify ERPP factors and challenges and cover the different components of ERPP in their teacher education courses. Similarly, EAP course designers can add up the ERPP components to their programs so as to develop the learners' ERPP competence. Finally, EAP researchers can use the designed instrument to examine the different components of ERPP in different disciplines.

Non-native students and authors find publishing a scientific paper in international journals one of the most challenging issues; yet, the linguistic demands and the requirement to ensure the relevance of their study to the international academic community are even more challenging. Given these challenges and difficulties associated with publishing in international journals, universities need to attach enormous

importance to instruction in research publication (IRP) being integrated into the academic courses. To continue this avenue of research, similar studies can be run with EAP or ESP participants of other disciplines or using other data collection instruments to create a more comprehensive picture of ERPP in various EAP contexts.

Acknowledgement

The authors are grateful for the insightful comments suggested by the editor and anonymous reviewers.

Declaration of Conflicting Interests

The authors declare that they have no conflict of interest.

Funding Details

This study did not receive any specific grant from funding agencies.

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