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Exploring ESP learners' self-efficacy of writing skills in IT context

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Abstract: *In the context of its application in engineering fields, language learning is an insufficiently researched area. Language competencies are a highly significant aspect of professional performance, business communication, and professional development, especially in Information Technology. The paper gives insight into the analysis of differences in the self-efficacy measured among three groups of students classified according to their achieved grades. The aim of this paper is also to investigate the correlations between the students' self-efficacy observed for five categories of writing skills in ESP and the students' assessment graded by the teacher during the summary writing task. Besides, the paper provides an analysis of correlations between different categories of writing skills. The total number of students who participated in the research was 94, and the participants were the students of Information technology at the Faculty of Technical Sciences Čačak. The research instrument was English language self-efficacy scale for writing skills. Three types of analyses were used: descriptive analysis, correlative analysis and the analysis of variance (ANOVA). The results of the research indicate that the higher the students' assessment is, the more skilled in writing in IT context they are considered in comparison to the students with lower assessment. The skills of writing fluency were estimated lowest over the entire sample. Positive correlations were obtained between all the analysed categories of students' self-efficacy for writing skills and the teacher's grades.*

Keywords: *self-efficacy; foreign language learning; ESP; IT.*

1. INTRODUCTION

Self-efficacy can be considered as an aspect of self-esteem which is "a well-researched psychological construct", and a significant factor affecting both the success and failure in life in general, therefore it constantly raises academic attention [1].

According to Bandura self-efficacy designates „beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" [2]. Habrat states that "self-efficacy is the expression of self-confidence in competence and skills to complete specific tasks" highlighting the fact that, compared to self-esteem, self -efficacy is the highest level of specificity [1]. In addition, Coopersmith proposes that self-esteem is an expression of "an attitude of approval or disapproval and indicates the extent to which the individual believes himself to be capable, significant, successful, and worthy" [3].

Literature suggests that there are two factors which affect self-efficacy, within the broader term of self-esteem, and those imply cognitive and affective domains [1]. Brown proposes that affect, usually opposed to rational cognition, suggests an „emotion-ridden sphere of life", which commonly relates to "the emotional interpretation of perceptions, information and knowledge'" [1].

The interactions between cognitive and affective processes are sophisticated and complex. Dörnyei notices that cognitive processes such as analyses, perceptions and evaluations can produce affective states, whereas affective factors including emotional experiences, beliefs and attitudes can cause cognitive consequences, due to the fact that they shape an individual's thoughts and evaluations [4].

Since language acquisition and learning is an interaction between cognitive and affective domains, self-efficacy, if observed and measured correctly, can be not only a significant factor influencing foreign language learning but also an indicator of the ways in which students engage with the linguistic content within a specific context. Therefore, besides cognitive, affective factors need to be thoroughly considered as well. According to Brown the most relevant affective factors related to foreign language acquisition are: anxiety, inhibition, extroversion–introversion which infers a need for the confirmed self-esteem, motivation, learner styles and self-esteem [5]. Self-efficacy is closely related to the notions of assessment and inner feeling of progress, as well as the ability to cope with mistakes and reflect on own values [6].

Lau et al. propose that English as a foreign language includes the concept of the self, such as

self-perception, self-esteem and self-efficacy, to name but a few, which are all related to four main language skills — reading, speaking, writing and listening [7]. Therefore, a vital correlation exists between self-efficacy and language acquisition, obtainable in evaluating writing skills.

Language acquisition, as "a genuinely ego-involving experience", requires personal expression, as it creates one's identity, and is a means of communication with the environment [8]. Therefore, it can also be a reason why inexperienced language users encounter discomfort and frustration when trying to express themselves in a foreign language. The perception of own abilities has a considerable role in managing a new language task, as it accounts for self-esteem and affects both motivation and the necessary cognitive processes [9]. The role of self-perception in second language acquisition is crucial, as it affects all aspects which are involved in language learning, including cognitive processes, evaluations, attitudes and behaviours [10]. Recent studies have shown that self-perception in foreign language learning reflects the expression of own confidence and self-efficacy related to foreign language abilities [11]. Gabillon proposes that "beliefs interfere with a student's cognitive performance in language processing" and thereby correlate with general second language achievement, considerably affecting the success or failure in learning [12]. Language anxiety is also closely correlated with self-efficacy and it signifies "the feelings of tension and apprehension experienced in second language acquisition in the classroom context, arising from the necessity to learn and use a foreign language that has not been fully mastered" [8]. This is specifically evident in a classroom in speaking and writing tasks, as these activities imply solving contextual ambiguities either in written or spoken language usually within a specified amount of time. Thus, such activities, which are likely to bear the potential for language users to slip into mistakes, cause anxiety, feeling of apprehension and discomfort [8].

Recent studies have shown that insufficient knowledge of the language and insufficient language practice cause lower self-esteem and higher language anxiety [1]. Avila claims that low self-esteem is crucial for the intensifying of language anxiety, thereby correlating both with "lower foreign language achievement and negative attitude towards the language" [13].

Vonk and Smit also confirm that high self-efficacy is closely related to high motivation to cope with learning issues and solve problems [14]. Moreover, Rosenberg proves that high self-efficacy is likely to result in successful outcomes [15].

Research in ESP shows that written language for specific purposes foreshadows not only linguistic features of a specific professional context, but the values and practices related to the professional environment [16]. Written texts in the field of Information Technology are distinguished by the use of specific rhetorical conventions, structure of arguments, tone of narration and grammatical features [17]. English language in IT is specifically targeted to language forms as a means to accomplish specific purposes. Moreover, English for specific purposes also designates not only the demand for communication, but also the study and deep analysis of the context targeted texts [17].

Furthermore, some authors found that practising summary writing skills have a positive influence on reading skills and comprehension as well as on writing skills [18], [19], [20].

Despite the fact that the task of summary writing presupposes more than grammar and vocabulary, the results of some research show that students instructed how to use grammar and stylistic corrections while writing their summaries make a better assessment in language learning, thereby creating a basis for the professional development [21].

Owing to the fact that one's native language and previous knowledge and experience significantly influence the way one structures own arguments and ideas in a foreign language [17], adequately instructed summary writing skills can affect students' learning process and contribute to students' language development, which can be evidenced in the linguistic features of the texts [21]. The texts assigned and required to be mastered at ESP courses are professional texts, which are characterized by their "expert character, its specialized goal orientation, and its conventionalized form" [17].

According to the previously said, the aim of this paper is to explore how students of different achievements in writing in English language perceive their self-efficacy in the ESP context and how self-efficacy, as an aspect of self-esteem correlates with teachers' assessment of students' writing skills.

2. RESEARCH METHODOLOGY

The aim of this research is to investigate the differences among students' attitudes on self-efficacy of their own writing skills in English language, depending on the grades obtained on the task of writing texts in IT field. In addition to this, the paper aims to find both the correlations between different categories of self-efficacy for writing skills (style, terminology, grammar, composition, writing fluency), and the correlations between students' self-efficacy and their assessment measured by the teacher.

Based on the objectives of the research the following hypotheses can be elicited:

- There are differences in students' self-efficacy of the writing skills in the field of IT, which relate to their real achievement measured by the teacher during the summary writing task in their professional context;
- The correlations between certain categories of self-efficacy of writing skills in IT (style, terminology, grammar, composition, writing fluency) are detected.
- The correlation between students' self-efficacy and their assessment measured by the teacher, i.e., the grade obtained during the summary writing task can be confirmed.

2.1. Sample and context of the research

There were 94 IT students who participated in the research. The research was conducted in May and June of 2022, at the Faculty of Technical Sciences Čačak, University of Kragujevac. The students filled in the questionnaire at the end of the semester upon the realization of the course English language for IT 2. All students have previously passed the course English language for IT 1. The course covered by this research is in the summer term in the curriculum of the first year, entitled the English Language for Information Technology 2. Summary writing is an important segment of the course and students are expected to be able to summarize academic articles taken from the information technology context at the end of the course. The students are assessed summatively. The assessment scale ranges from 6 to 10 for the students who pass.

The students were divided into three categories according to their assessment evaluated by the teacher: group of students who obtained grade 6 or 7 at the summary writing task (39 students); group of students who obtained grades 8 and 9 (33 students) and group of students who obtained grades 10 (22 students). The grades given by the teacher were formed according to their knowledge of English language which students demonstrated through the written lexical and grammatical corpus in the IT context.

2.2. Research variables

Interdependent variables of the research are the subcategories of the self-efficacy of writing skills in the English language in the field of IT. These variables relate to subcategories classified as: style, terminology, grammar, composition, and writing fluency. Style as a subcategory was perceived through four statements and is a variable which presents using language differences, functions and shifts in meaning. Terminology implies a subcategory of four statements related to the analysis of words and parts of the words in context. Grammar is a variable perceived through three statements related to the proper use of English grammar, spelling rules, verb tenses, voice and mood. Composition relates to structuring sentences and clauses and this variable is defined through five statements. Writing fluency refers to the appropriate use of word patterns, vocabulary and content and is determined by three statements.

The independent variable of the research was students' assessment in summary writing in the IT field measured by teacher's evaluation.

2.3. Instrument

The scale used for the research was the English language self-efficacy scale for writing skills which was adapted from the Self-Efficacy Scale for Scholarly Writing in English [22]. The scale was used to assess the self-efficacy of 94 University students from the Faculty of Technical Sciences Čačak. The scale takes a form of a 19-item Likert-type items scale (Appendix). The students were requested to respond and evaluate each statement using a 5-point-Likert scale by marking one from five given options from 1 – I strongly disagree to 5 – I strongly agree).

The Scale consists of 19 statements in total, items classified into five subcategories of self-efficacy for writing skills in the field of IT:

- Style relates to skill models which measure the use of language universals, language differences such as mixed metaphors, functions and shifts in meaning, the use of dictionaries (varieties and kinds of thesauruses) [23] (4 items). Cronbach's coefficient for this subscale is 0,77. Example: I can use words and phrases that signal transitions effectively.
- Terminology refers to vocabulary which reflects analysing words in context and analysing word parts [23] (4 items). Cronbach's coefficient for this subscale is 0,78. Example: I can write on the topic of the ESP text clearly and intelligibly in English.
- Grammar implies spelling rules, capitalization, punctuation, verb tenses, voices and mood, subject-verb-agreement, using pronouns and modifiers correctly [23] (3 items). Cronbach's coefficient for this subscale is 0,83. Example: I can write a text in accordance with the rules of English grammar.
- Composition which relates to clauses and sentence structure, phrases, content and structure check, tone analysis [23] (5 items). Cronbach's coefficient for this subscale is 0,78 (5 items). Example: I can organize paragraphs effectively while writing English texts.
- Writing Fluency signifies the accuracy of text and the appropriate use of word patterns, vocabulary and content in a specified amount of time (3 items). Cronbach's coefficient for this subscale is 0,75. Example: I can produce English texts in the same amount of time I produce texts in my mother tongue.

Cronbach's coefficient for the whole scale is 0,94 which indicates the high reliability of the used instrument.

3. RESULTS AND DISCUSSION

In order to determine both the students' self-efficacy for writing skills through five different subcategories, and the differences in the self-efficacy among students that achieved different grades, we used descriptive analysis together with the analysis of variance (ANOVA) and their results are shown in Table 1.

Table 1. *Differences in students' self-evaluations for writing skills in the field of IT*

Scales	Groups	Mean	Std. Dev.	F	Sig
Style	6-7	3.23	0.5933	15.597	0.000
	8-9	3.71	0.5918		
	10	4.12	0.6104		
	Total	3.61	0.6857		
Terminology	6-7	3.33	0.4566	22.646	0.000
	8-9	3.76	0.6090		
	10	4.32	0.5834		
	Total	3.72	0.6629		
Grammar	6-7	3.18	0.5837	28.624	0.000
	8-9	3.96	0.6449		
	10	4.37	0.6403		
	Total	3.73	0.7836		
Composition	6-7	3.39	0.5587	11.049	0.000
	8-9	3.79	0.6361		
	10	4.13	0.5708		
	Total	3.71	0.6524		
Writing Fluency	6-7	3.06	0.6617	12.708	0.000
	8-9	3.7	0.7921		
	10	4.05	0.9331		
	Total	3.51	0.8698		
N=94					p<0.05

The results shown in Table 1 show that students evaluate their own writing skills in the English language in the IT context field as moderately high (total mean values for all subscales are above 3,5). The category marked with the lowest students' grade relates to writing fluency (M=3.51), i.e. the accuracy of text and the appropriate use of word patterns, vocabulary and content in a specified amount of time. As for all other categories, the estimations are rather similar (almost all values are close to the mean value which amounts to 3.7). This result indicates that the affective factor could be the possible reason why students consider their skills within the category of writing fluency lowest, as the students need to cope with many aspects of foreign language rules while expressing themselves in a limited amount of time and thereby expressing a limited feeling of self-efficacy as an aspect of self-esteem. The results of the conducted research are in compliance with the results of other authors who investigated the interdependence between self-efficacy and academic achievement [15]. Sanchez and Roda pointed at the correlation between self-esteem and achievement in mathematics and text reading, and concluded that academic performance is less significant than self-esteem in corresponding areas [24]. Moreover, Marsh, and Craven also confirmed the strong link between self-esteem and academic achievement, highlighting the fact that academic self-esteem highly affects academic assessment [25]. In addition to this, Pullmann and Allik investigated the correlations between the academic assessment and university students' self-evaluations, and concluded that the students who demonstrated high academic assessment were also rewarded by the teachers [26]. All the mentioned studies show that self-esteem correlates with the assessment in the respective field of research.

The results of the present research also indicate that statistically significant differences occur in the assessment of all five categories between the three groups of students classified according to their obtained grades (grade categories: 6-7, 8-9 and 10). The value for all the estimated categories is $p = 0.000$ (<0.05). Mean values indicate that the students with the highest achievements (group of students who obtained the highest grade, 10) are assessed as the most skilled in all the investigated categories, compared to the remaining two groups of students, which was a rather anticipated result (mean values for all categories are above 4). Therefore, students who are more successful self-evaluate more positively their own writing skills in the English language in the IT context, in comparison to less successful students. On the other hand, the group of students who were assessed with the grades 6-7, evaluated their own writing skills lowest in comparison to the other two groups according to all categories, which is also in compliance with the evaluations of the most successful students.

In order to determine where statistically significant differences occur (between which of the groups of students), the posthoc analysis was carried out, and the results are shown in Table 2.

Table 2. *Review of statistically significant differences in self-assessment of writing skills among three groups of students*

Dependent Variable	(I) grades	(J) grades	Mean Diff. (I-J)	Std. Error	Sig.
Style	6-7	8-9	-0.476*	0.1407	0.004
		10	-0.889*	0.165	0.000
Terminology	6-7	8-9	-0.434*	0.1286	0.004
		10	-0.987*	0.1452	0.000
	8-9	10	-0.553*	0.1624	0.004
Grammar	6-7	8-9	-0.785*	0.1456	0.000
		10	-1.189*	0.1688	0.000
Composition	6-7	8-9	-0.394*	0.1426	0.022
		10	-0.733*	0.1524	0.000
Writing Fluency	6-7	8-9	-0.637*	0.1739	0.002
		10	-0.986*	0.2254	0.000
*. p< 0.05					

The results obtained from the analysis of the differences between the groups indicate that the group of students who achieved grades 6 and 7 differentiates according to categories of assessment in comparison to the groups of students who obtained higher grades (8-9 and 10) (all p values are below 0.05). The greatest difference is obtained between the students marked with the grades 6-7 and 10 for the category of correct use of grammar during writing text in English in IT context (Mean differences = -1.19), whereas the slightest difference was established between the group of students marked with the grades 6-7 and 8-9 for the category composition, which suggests sentence and clauses structuring and structure check (Mean differences = -0.39). The group of students marked with the grade 10 is significantly distinguished from the group of students marked with the 8-9 only in one category which relates to vocabulary development (the application of IT terminology in its specific field) (Mean differences = -0.55). For all other categories statistically significant differences were not found between these two groups of students.

In order to determine possible links between estimated categories of writing skills in the English language in the field of IT, the correlative analysis was conducted and the results are shown in Table 3.

Table 3. *Correlation between categories of self-evaluation of writing skills in English language*

Subscales	2.	3.	4.	5.
1. Style	0.75**	0.66**	0.73**	0.62**
2. Terminology	1	0.71**	0.82**	0.84**
3. Grammar		1	0.71**	0.61**
4. Composition			1	0.71**
5. Writing Fluency				1

The conducted analysis indicates moderately strong and strong correlations between all five categories of writing skills (r=0.61-0.84). The strongest positive correlation was evinced between the categories which relate to the use of terminology and writing fluency (r=0.84), whereas the weakest correlation (although moderately high) was noticed between the categories of grammar and writing fluency (r=0.61). Therefore, the higher the students' mark on the self-efficacy statements related to the category of terminology (which implies the ability to analyze words and word parts in context), the higher the self-efficacy statements related to the categories of style, writing fluency, grammar and composition. This suggests the integral role of self-efficacy in enhancing students' achievement in language. Tsao also explores and confirms the link between writing self-efficacy in the foreign language and the learner's engagement with the teacher and written corrective feedback [27].

In this research correlative analysis was also used in order to determine the correlations between students' self-efficacy in writing skills in the English language in their context field and the objective assessment obtained by teachers. The results of the analysis are shown in Table 4.

Table 4. *Correlation between students' self-efficacy and grades given by teachers*

Subscale	Teachers' grades
Style	0.51**
Terminology	0.58**
Grammar	0.61**
Composition	0.44**
Writing fluency	0.46**

The results suggest that there is a statistically significant positively directed correlation between the grades given by the teacher to students on the summary writing task in their professional context and the students' self-efficacy for all five categories of writing skills (r=0.44 to 0.61). The strongest positive correlation with the final teacher's assessment (grade given by the teacher) was obtained for the category which relates to the adequate use of grammar rules (r=0.61). Such results show positive correlation between teachers' assessment and students' self-efficacy, which indicates not only the objectivity of students' achievement evaluated by the teacher but also the objectivity of the students' self-efficacy estimations. Other studies also show positive correlations between students' self-efficacy and their real assessment [12], [15]. Thus, the higher the interdependence between the skills estimations, i.e. self-efficacy for the use of the written language in the professional fields, the greater the students' assessment.

4. CONCLUSION

The results of the conducted research proved the presupposed hypotheses. The main results give insight into students' evaluations of self-efficacy for writing skills in an IT context. The skills of writing fluency were estimated lowest over the entire sample, which was the anticipated result, as writing fluency implies more writing skills which permeate each other. Therefore, the teachers should pay more attention to developing writing fluency skills with their student, since they themselves notice gaps in this particular domain.

The results show that there are differences in the evaluations of students' self-efficacy of the writing skills in the field of IT depending on their real achievement measured on the summary writing task.

There are significant positive correlations between all the categories of writing skills in the ESP context, which suggests that there is a connection between skills such as text style, vocabulary knowledge, the application of grammar, text composition and writing fluency, so the mentioned categories should not be observed or developed separately. This finding suggests that the improvement in one category positively affects the development of all the observed categories related to writing.

The found correlations between students' self-efficacy of writing skills and their assessment measured by the teacher during summary writing in the IT context indicate that students' perceptions of self-efficacy comply with their real achievement, and consequently the objectivity of estimation. The statistically significant positively directed correlations between the grades given by the teacher to students during the summary writing task and the students' self-efficacy observed for all five categories of writing skills indicate both the objectivity of students' assessment evaluated by the teacher and the objectivity of the students' self-efficacy estimations. Bearing in mind that the students were not given preliminary instructions on self-efficacy, the present results indicate that they would considerably benefit from self-efficacy training.

Such results confirm the already explored links between self-efficacy and assessment, especially in the context of language, where various affective components, as well as personal characteristics, can significantly influence the language learning process. This also suggests the integral role of self-efficacy in enhancing students' achievement in language.

The implications for future research could imply the analysis of other language learning factors, such as anxiety, motivation, learning styles, personality types, etc., which affect not only students' achievement but the process of language learning in the area of ESP and IT in particular.

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Appendix

English language self-efficacy scale for writing skills in ESP context

	Skill
1.	I can write on the topic of the ESP text clearly and intelligibly in English.
2.	I can write a text in accordance with the rules of English grammar.
3.	I can express the main idea of the text in ESP clearly
4.	I can express the aim of the author of the given text intelligibly in English.
5.	I can clearly express the gap(s) in the text and emphasize its significance.
6.	I can organize paragraphs effectively while writing English texts.
7.	I can avoid word repetitions while writing English texts.
8.	I can form accurate sentences while writing English texts.
9.	I can use English spelling rules accurately.
10.	I can use words and phrases that signal transitions effectively (e.g., in addition, nevertheless, furthermore, notwithstanding...)
11.	I can use boosters appropriately while writing English texts (certainly, indeed, always, undoubtedly, clearly, actually, obviously, conclusively, definitely, evidently).
12.	I can use hedges appropriately while writing English texts (perhaps, possibly, probably, presumably…).
13.	I can use expressions that make my English text appealing and interesting for the readers.
14.	I can produce English texts in the same amount of time I produce texts in my mother tongue.
15.	I can produce English texts as easily as I create in my mother tongue.
16.	When I read English articles, I can guess the meaning of unknown words.
17.	I can make new sentences with the words just learned.
18.	I can make sentences with English idiomatic phrases.
19.	I can find out the meaning of new words by using English–English dictionaries.