

SCIENTIFIC ARTICLE PREPARATION: TITLE, ABSTRACT AND KEYWORDS

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Scientific article writing is undoubtedly an inseparable part of academic activity. Every researcher/scientist, in one way or another, has to declare scientific research activity results, i.e., to publish in scientific press. If this is not done, it is considered that a scientific work is not finished regardless of the size of the research/experiments carried out and so on. Such information has to be completely understandable not only in the academic environment but also in society. Publications in the international and independent science journals acknowledged in the academic community show the real value of the scientist and his works. This does not mean in any way that the other level publications are not necessary (Lamanauskas, 2013). Every publication has its auditorium, purpose, aims and so on. Regardless of the type of publication broadly speaking, it has to be appropriately prepared.

On the other hand, every scientist and/or researcher is different, first of all, in the sense of academic literacy. Academic literacy formation is one of the constituents of the academic activity. Thus, an appropriate academic literacy level is necessary. The question only is what an appropriate level means. According to the researchers, academic literacy is a complex wholeness of abilities, knowledge and attitudes covering both general and special items, typical only for academic literacy (Žukauskienė & Erentaitė, 2011). Writing, first of all, is a direct analysed material/information presentation in written form and visualisations, isn't it? And such presentation is inevitably focused on other people, i.e. scientific information consumers/readers, who are not exhaustively acquainted with the particular research and/or area of interests. Academic writing is a manifold construct joining such essential elements as specific science field understanding, scientific research methodology understanding, statistics knowledge, finally, native and foreign language culture understanding. For academic writing, it is important to understand well not only scientific text characteristics (e.g., clearness, completeness, originality) but also responsibility (e.g., research methodology validity/reliability/suitability, formulated conclusions and /or presented recommendations).

It is understandable that researchers are people having different qualifications, experience and so on. However, inevitably each of them constantly encounters academic writing challenges. Scientific research activity is not a static, unchanging thing, on the contrary, it is a dynamic activity.

From the classical point of view, there exist two though closely related however different scientific activity processes. The first one is search for a scientific research idea, grounding, research planning and carrying out. The second one is the carried-out research description and presentation. Presentation is usually understood as research procedure and result public announcement. Despite the fact that plenty of various advice, recommendations, examples on academic writing questions are published, nevertheless, it is necessary to accentuate some essential things preparing a scientific article. Here the focus is put on social science field scientific publication preparation (for example, education). On the other hand, we think that it is useful for the other field scientists as well.

An Article Title

One could hardly find a scientific article which did not have a title. One can say that basically the whole research scientific idea/problem is described in one sentence. To say it in other words, the title of the article creates the first impression about the article itself, more exactly, about the carried-out research. Quite often the researchers try to make the title very impressive, attractive, captivating. Some researchers accentuate the article attractiveness a lot (Poviliūnas & Ramanauskas, 2008), which is probably not rational. Often enough a certain field jargon is used or even slang, various abbreviations and so on. This, of course, should be avoided. On the other hand, readers are potential authors of the future articles who will hopefully use, cite, paraphrase, report etc. on a particular published article. From this it follows that the title of the article has to attract the reader’s attention.

Here are presented some partly appropriate and, in our opinion, inappropriately formulated title examples (Table 1).

Table 1. Article title examples.

Appropriately formulated	Inappropriately formulated
<ul style="list-style-type: none"> • Fairytales creation possibilities of children with attention deficit hyperactivity disorder in diagnostics of psycho-social and cognitive sphere • Integration of the disabled: The formation of positive attitude toward disabled in the process of musical education • Examining secondary school students’ misconceptions about the human body: Correlations between the methods of drawing and open-ended questions • Cooperation of the pre-service chemistry and geography teachers on an interdisciplinary lesson planning • Factors influencing the first-year students’ adaptation to natural science studies in higher education. 	<ul style="list-style-type: none"> • Lifelong learning of university teachers – dilemma or synergy • Alcoholism is bad • The aspects of student learning motivation • University governance reforms • ICT in science subjects • Management of resources in early childhood development centers and its implication for quality of education in Bungoma district, western Kenya • Distance – remembrance – tolerance • Physics education in kindergarten • Learning for earning - student expectations of universities and administrator perspectives. • On investigation pupils’ attitudes towards biology.

If we could look at these examples, we could see that inappropriately formulated titles are usually of a very general type, not concrete, unclear, some of them are very complex and so on. It happens that the title of the article is formulated in the form of a motto e.g., “Qualified teacher - future society creator”). Frequent cases are when in the titles of the articles such phrases are found as “Research on...”, “Investigation about ...”, “Analysis of ...”, “Lessons learned...”, “A study on...”, “Research about ...”, “Mixed research on ...”, and so on. These are inappropriate elements of the title. First of all, every scientific article describes one or another carried-out research. Therefore, to include concepts “research”, “analysis” in the title is not purposeful. Another rather frequent case is when at the end of the title after the colon the type of research is indicated, e.g., “comparative analysis”, “case study”, “correlational research”, “factor analysis” and so on. In certain cases, it is purposeful especially when, for example, in the article research instrument creation, validity, reliability estimation and other are described. Uncertainties also arise when the title is constructed as a presentation of partial results. E.g., the title “Spatial images and changes in their graphic representation in primary and lower secondary school students (preliminary results of the research)” is unclear. Already beforehand it is not clear what preliminary research results mean. Besides, a part of the title is presented in parentheses. The other example also shows that the title is inappropriately formulated. For example, in the title “Chemistry education research: Content analysis”, two methodological concepts are used – research and analysis. Such title is neither informative nor methodologically correct.

Formulating the title of an article, the author should evaluate the chosen keywords as well. It has to be an obvious link between the title of an article and keywords. According to the given keywords, one can find analogical and/or similar analysed sphere articles.

The length of an article is the thing of no less importance. It is worth to remind that following APA recommendations, the length of an article should not be more than 12 words (Publication manual APA6th ed., 2.01, p. 23). It goes without saying that this is not an imperative attitude, and it means that there can be some more and some less words in the title. However, it is obvious that it would not be possible to formulate a scientific article title with 3-4 words, as well as it would not be purposeful to use 15-20 words. Therefore, one can think that an interval between 6 to 12 words is optimal for the article title formulation (mainly, in social science field).

One more variant happening quite often is when an article title is formulated in the form of a question. Though, one can notice various positions in the scientific discourse, I think that such formulation is not appropriate. Some published article examples can be presented (Table 2).

Table 2. Article titles and sources.

Title	Source
What type relationship do we have with our brands? Is the name of this relationship brand romance?	International Review of Management and Marketing, 2017, 7(2).
Does attending a public or private university make a difference for students in Colombia?	International Review of Management and Marketing, 2017, 7(2),
What is equality of opportunity in education?	Theory and Research in Education, 2016, Vol. 14(1).
How broadly does education contribute to job performance?	Personnel Psychology, 2009, 62.

These are only some examples. Firstly, it remains unclear how research title correlates with possible research questions. As can be seen in Table 2, the first article title consists even of two questions. The other article titles are expressed in the form of one question. Such formulations are not appropriate.

Abstract

Article abstract preparation is not an easy process, however a well-written abstract as researchers claim forms possibilities that the research will be noticed, used, but not ignored, and not used properly (Sousa, Driessnack, & Flória-Santos, 2006). First of all, this is because it is a very limited size text, in which the whole article essence has to be reflected. The abstract size varies, different journals raise slightly different requirements. In the literature it is indicated that the size of an abstract can also reach 400-500 words (Dash, 2016), however, it is obviously a too wide text. Following APA recommendations, the abstract size varies in the interval between 150 – 250 words (Publication manual APA, 2.04, p. 25). One can claim that most science journals meet these recommendations regarding the requirements of an abstract. Every author should understand that an abstract is short characteristics of a scientific article, in which a carried-out research is described. Namely characteristics but not retelling of the content (especially wrong approach is when the abstract text is compiled from separate parts of the already written article). Moreover, an abstract performs a marketing function. Preparing an abstract, the article's purpose, content, type, form and other peculiarities are taken into consideration. What is more, one has to avoid source content retelling, various abbreviations, and links (references)

to literature sources. A very frequent drawback is that an abstract is prepared using various structural part elements of a written article. Such compilation is completely worthless. As a rule, an abstract is written when the whole article text is basically finished. Otherwise speaking, an abstract should convey to the reader a gripping story about the conducted research. There shouldn't be a place in it for any misinterpretations.

In an abstract, first of all, the main research idea and/or a problem is presented and research motivation, i.e., why the research is conducted. Quite often, the authors start an abstract straight away presenting the aim, e.g., “the purpose of this study was...”, “this study aimed to...”, “the research aimed to analyse...” etc. The other drawback is when an abstract is started with the obtained research result presentation, e.g., “In this research, the impact was...”, “The results indicated that...”, “The results show that...”, etc. In this case, it remains unclear what was analysed and why in a particular research. The third mentioned drawback is when it is written not about the conducted research in an abstract, but about the article itself. As a rule, such phrases are used e.g., “This paper presents...”, “This article builds on and contributes to...”, “The aim of this paper is to...”, “This scientific paper presents...”, “The purpose of this article is to...”, “This article, written within the framework...”, “The paper analyses...”, “The problem of the article is...” and other. In academic writing practice one can encounter the most diverse types of such phrases. Basically, it becomes close to an article annotation, on the other hand, quite often from a logical point of view it is wrong e.g., an article of its own accord does not have a problem. It is necessary to emphasize that an abstract and annotation are two different things. Usually in the annotation, the article itself is described in a few short sentences and the structure of the annotation itself does not repeat the article structure. In the case of an abstract, the text basically repeats the article structure regardless if the abstract text is structured or not. As it is known, structured abstracts are typical to medical literature and clinical trial reports (Nakayama, Hirai, Yamazaki, & Naito, 2005). However, a possible and even recommended variant is to write an abstract at first as a structured text, e.g., first of all, to define the research idea/conception, separately to describe motivation and the main aim, afterwards, methodological aspects, and finally the most important research results and conclusions/implications. Later, according to Mack (2012), one can join all parts into an integral text and get a traditional abstract. Such an attitude is quite rational, except that such integral text is considered a traditional abstract text form.

Having discussed the research problem and/or the main idea, the research design is defined, research data gathering methods and instruments are presented, research population and sample are described, concisely are described theoretical perspectives and/or theoretical framework, essential results and conclusions/implications. It is understandable that, first of all, this suits in the case of quantitative, empiric research. In other cases, some of the mentioned elements might not be, they are changed by others (e.g., if purely qualitative research is described). If the size allows, it is desirable to show the carried-out research contribution to the body of knowledge (value-add).

Let us have a look at the two article abstracts, which are presented in Table 3.

Table 3. Article abstracts.

Appropriately prepared abstract	Inappropriately prepared abstract
<p>Research on children's ideas about biological phenomena showed that their interpretations of natural phenomena often differ from those of scientists. The purpose of this study was to investigate children's ideas about animal breathing systems. This study was descriptive in nature and consisted of a cross age and cross-cultural design involving the collection of qualitative data from a total of 549 children from two distinct countries, Slovakia (n = 248) and Turkey (n = 301). The results revealed that understandings of invertebrates breathing systems were generally poorer than understandings of vertebrates breathing systems. Turkish children acquired better scores than Slovakian children. Although some children were able to identify breathing organs of animals, they had difficulties with describing how breathing works.</p>	<p>Quality assurance is important for learning and teaching process. Quality assurance is new type of working in universities of the post soviet countries after implementation of the Bologna Process. It is uncultivated soil, when we must work so much and the at same time we can create new approaches. We researched problems of understanding of the essence of quality assurance, that why we conducted survey with academic staff. The results was very interesting. It seems, some of respondents has sophisticated attitude with quality assurance. In general, the stereotypes are viable, especially, when there are ideological stereotypes. Therefore, the post soviet stereotypes today impact on our mentality. In the article I tried to show my vision and strategy within the quality assurance, which I use in a practice.</p>

As can be seen, the size of both abstracts in words is similar (120 and 127). Taking into consideration already mentioned APA recommendations, one could still expand these texts, including valuable information describing the conducted research. In the first case, one can see that research idea/problem is clearly defined, research aim is presented in one sentence. Also, in one sentence very briefly is described research type and design, gathered data type and research sample. Later the essential results are defined. Of course, the discussed abstract is not absolutely perfect. One can discern that it lacks conclusions and practical/didactic implications. Also, the carried-out research significance, added value are not reflected. In spite of this, such abstract can be considered sufficiently appropriate. In the second case, one can see that general type information dominates in the abstract text. The first two sentences simply repeat well known truths and/or statements. Instead of the obtained essential result presentation, it is just written that the results were very interesting. The text is personalised, written in the first person, there are language mistakes in it. One can say that the text has a clear emotional charge. Basically, such abstract does not describe the conducted research and does not characterise it.

Still some more practical things. Appropriately written abstract is also important that it is placed into various data catalogues. Usually, abstracts are free of charge/and have unlimited access even if the article is not in the open access journal and/or database.

Keywords

At the end of the abstract keywords are usually presented. This is APA style recommendation. The other variants are also possible. Most frequently from 3 to 5 keywords are presented. Undoubtedly, in some cases there can be more of them, however it is obvious that only two keywords, is too little. Except the main research idea (problem), at least one keyword has to identify the carried-out research methodology, e.g., factor analysis, comparative research, qualitative research and so on. The author of an article has to evaluate that the chosen keywords as optimally as possible characterise the described research. Though it seems that it is a completely easy task, scientific research practice is different. Some examples are presented (Table 4).

Table 4. Article keywords.

Article title	Keywords
Methodology of classroom environment measurement, respecting the diversity of the students of elementary school in the conditions of integration	Integrative educational reality, conditions of integrated education, diversity of school class, special educational needs of regular school students, equality strategy, selected results of empirical research, recommendations for pedagogical practice
Formative assessment of student progress	Assessment, teachers, students
The study of reactions of interaction of metal — binary compounds of metals based on activity series of metals	Properties of metals, series of metal activity by element, substitution reactions
Management of the communicative competence development in future physical education teacher	Communication, communicative competence, communicative component of training, level of maturity of communicative competence, education
The analysis of possibilities of using foreign language texts of literary works in teaching English at the university	Additive complexity, creative tasks, „critical point“, communicative competence, culturological obstacles, independent reading, intercultural communication, socio-cultural component, structure and features of the text, unadapted literary works (authentic texts)

In Table 4 one can see that both article titles and chosen keywords raise reasonable doubts. In the first case, keywords are obviously unclear, chaotically presented, there are too many of them. Some of them in reality are phrases of the text, but not keywords. In the second case one can see that three words are presented. One can claim reasonably that these are the most general type concepts, practically met in every scientific article of educational field. Using such keywords in the search systems, e.g., Google, one will not find necessary information. In other words, publication will be absolutely non-searchable because Google currently gives 975,000,000 results for “teachers” and 2,870,000,000 results for “students”. In the third example, keywords are also chosen inappropriately. E.g., keyword “education” does not say anything at all about a particular article because it suits to all announced publications in the educational field. The third example given in Table 4 is completely wrong because according to content it is a didactic field publication. According to keywords one cannot decide about the type of a prepared article. In the case of the fourth example, one can speak up the same already mentioned shortcomings. It is most logical when two words make one keyword, in some cases three, e.g., “social media”, “inclusive education”, “peace education”, “quantitative content analysis”, “youth policy monitoring”, etc. As it was already mentioned, it is inappropriate to use phrases as keywords, e.g., “a new method for solving tasks with parameter”. It is recommended to avoid “of” and “and” in word combinations, e.g., “teaching and learning”, “teacher and lecturer”, “organizational models of learning”, and other. Usually, a single word cannot be as a keyword (or concept), e.g., “education”, “teaching”, “student”, etc. A keyword may be just a single word, but then it must be very specific like “neuroeducation”, “nanotechnology”, “gamification” and so on. It is worth to pay attention that according to its initial meaning, a single word makes a keyword. If there are more words, then there is a keyphrase. In the given examples it can be seen that keywords are confused with keyphrases. There is no special difference, however, keywords are single words, while keyphrases are made up of a few words. As it has already been mentioned, both of them characterise the prepared scientific article. However, it is recommended not to confuse. In scientific work practice the term “keyword” has settled. As it has been mentioned, keyword formation of two-three words is grounded and useful carrying out information search. To be exact, such construction is called long tail

keywords. However, such keywords in many cases are specific. There are cases when it can be complicated to judge about a scientific text only from given keywords because they can be interpreted multi-meaningfully. The authors should evaluate this seeking to avoid keyword multi-meaningfulness. Also, the thing happening quite often is using various abbreviations. Some of them, generally accepted abbreviations can be used e.g., DNA, ICT, AIDS etc.

Summing-up

It is reasonable that every scientific article is original. In addition to general scientific article preparation requirements and principles, there exist particular science field/branch peculiarities. Finally, there is already no talk about one universal scientific discourse. According to Sinkūnienė (2014), there exist different scientific discourses, a certain variety of them. Constant competence improvement in academic writing sphere is inevitable and necessary.

Note

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