

# Writing scientific theses/dissertations in biology field: confusing in using abstract and summary term

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## Abstract:

Writing the abstract in a thesis, a dissertation and in a scientific paper is of a great importance to condense the contents in well readable and self expressible short text. The abstract should give a real, precise, accurate and satisfied picture for the entire scientific article. Two terms (abstract and summary) were used widely by Iraqi biological sciences postgraduate students as the first chapter in their theses and dissertations writing. These both terms usually are different in their context writing style and in their content. It is supposed that abstract should be used in the writing of scientific articles, thesis or dissertation instead of summary. This study hypothesized that those students have no knowledge and skill to differentiate between abstract and summary terms in their writing process. This study involved reading and analyzing of 124 thesis and dissertations from different biological disciplines and involved also interviewing 114 postgraduate students to uncover the accuracy of using those two terms and to have proper idea about their knowledge in abstract writing guidelines. The results revealed that most students didn't differentiate between abstract and summary in their writing, no abstract was written correctly indicating that the students lacked the knowledge and skill of abstract writing guidelines. The students did write their abstract by blindly mimic the previous students writing style without any attempt to check the accuracy of writing process. Reconsideration for postgraduate students' syllabus must be taken to establish rigid system for scientific writing based on international guidelines.

**Keywords:** Biology, writing, abstract, thesis, dissertation

## Introduction:

Research findings cannot reach the hands of researchers, students and other audience without publishing them. Writing of these research and findings must be performed correctly and in well style that makes the readers have a desire to read them. Therefore writing process is the only important tool that is able to disseminate the research findings worldwide. Abstracts are an important part of any thesis or scientific articles which usually occupy the beginning of any paper. Writing abstracts have not received high attention from research compared with other part of a paper (1) although the UNESCO (2, 3) and the American National Standards Institute (4) published a guidelines for abstract writing; however theses guidelines are still limited to be used widely, and they are also still limited to be used by native speakers of English

(5, 6, 1, 7). Therefore it is expected to find a lot of variation in abstract writing style both in guidelines and in its content among scientific articles and students' thesis or dissertations (8).

Nowadays with the high advanced technologies in communication and information explosion accompanied by vast availability of electronic journals and books with easy access, it becomes impossible for students or researchers to read all published scientific article thoroughly. This information overload has become obvious problem among scientific media (9). Whatever researchers and students try to read more they will be challenged by unavailability of enough time to cover all publications; They have to find simple way to review most of these articles without losing the important data. Hence, reading abstracts may be the best method to perform that task and let the researchers and students more satisfied. Accordingly, for getting the accurate data the abstract must be written parallel with the body of the paper in content and order (10). For that purpose almost in all scientific thesis or article the abstract either printed before the body of an article or presented to a seminar or a conference (11) to represent the

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entire article. Crystal (12) defined the abstract as a summary of a piece of writing, moreover Johnson and Scott (13) reported that abstract must offer all essential information from the entire article through a very limited number of words. The abstract should be written as a brief summary of the all important components of the article; therefore the abstract must cover the aims, introduction, methods, results and conclusion (13, 14, 15). That is because the potential readers prefer to obtain an idea about what the article is about rather than goes to read the full text, and that will help them to decide whether to read the rest of the article. Therefore the abstract part can be considered an important clear screen for the scientific articles which can be read to get a quick overview. The philosophy of abstract writing was firstly mentioned by the rhetoric father Imam Ali about 1500 years ago who said "The best talk is that being succinct and indicative" to focus on the scope and importance of the abstract (16). Most international writing systems focus on the importance and value of the abstract because abstract summarizes the essential idea, findings and interests of the paper in about few hundred words which clearly can reflect the summarized contents of the article (17, 3, 18, 19, 10), hence the abstract reflects the mind of the author of the research paper. Because abstract is usually read first and may be the only part read, therefore abstract must be accurate, specific objective and self contained (20). Accordingly abstracts strongly need a lot of attention and polishing to make them well accepted by the readers by giving them a good idea of what to expect in the entire article and allow them to determine quickly whether or not an article contains materials of interest and open further studies (21).

The term summary, on the other hand, refers to the summarization of an essay or a chapter in a book or an act in a play, whereas the abstract is a short form of a research paper in a nutshell (3, 22, 23, 14). Therefore Abstract and summary are two terms being used differently in relation to a thesis or a research paper and an essay or a chapter. A summary can be applied for any chapter in a novel or scene. It cannot be used the word 'abstract' to mean summary. Abstract is of the entire chapter while summary can be of any of the parts of the chapter or represents the main points in the article (24, 25). A summary may give an overall idea of the entire concept or simply said it is the representation of a long concept in short form (26). However, Antic (27) reported that summary may involve the findings and conclusions only. Rathbone (28) and Kolin (25) also confirmed that and reported the differentiation criteria between abstract and summary term.

However, the terms summary and abstract are often used by many students and researchers interchangeably resulting in some confusion. Most academic researchers, experts, and peer reviewers may face that problem when they come to evaluate an article or a thesis. Although there are vast number of literatures has been reported about how to write scientific paper (29, 30, 28, 31, 32) but very few have discussed the difference between the using of abstract and summary term in scientific writing (29, 24, 25, 27). Depending on the experience with dealing with the thesis or dissertation of Iraqi

postgraduate students, it is expected to reveal the possible confusing in using abstract and summary term in their writing. According to available literature no Iraqi study has discussed this problem, and this may make student to transfer their writing style to other student even it may be not correctly written. Therefore this study hypothesizes that most students write their abstract or summary regardless of taking any consideration for the difference between their contexts.

Researchers and students in the field of biology and medicine at Iraqi Universities frequently write their scientific articles and thesis or by using different writing styles (34). Although the Ministry of Higher Education and Scientific Research (MOHESR) has documented specific instructions for thesis/dissertation (TDs) writing style, most postgraduate students still write their TD away from these instructions. However these instructions did not focus on the difference between abstract and summary term. The term abstract or summary may be confusedly and wrongly used by students. This attempt was proposed to focus on the accuracy of using those both terms in the biology TDs in some scientific faculties in Iraqi Universities hoping to approach right recommendations to eliminate the possible confusing of using those two terms.

## Method:

This study was conducted in the Iraqi Centre for Cancer and Medical Genetics Research (ICCMGR) through reading the TDs accomplished in this centre and through making interview with postgraduate students who did their TDs.

Students, who performed these TDs, were from different disciplines and faculties including biology, medicine, veterinary medicine, pharmacy, dentistry and agriculture. All those TD were under the supervision of different professors from different colleges in collaboration with ICCMGR researchers.

The study included the TD written between the years 2001-2012 and the number of TD was 124 for both master and doctor of philosophy degree. Each TD was studied carefully with special focus on the main points of the TD like introduction, methods, results, discussion and conclusion with recommendations. Then abstracts and summaries were studied deeply in compare with entire body of TD to identify the writing style used by the students under the abstract or summary heading. Then text under each term was matched with the standard guidelines of scientific writing. The standard guidelines for abstract writing methods were based on what was accepted internationally (4, 22, 3, 6).

The interview with the students included seven questions to show their understanding for abstract writing guidelines. The questions were:

- 1- What is the abstract in the TDs?
- 2- What is the summary?
- 3- Do you know the difference between abstract and summary?

- 4- What are the contents of the abstract?
- 5- What is the hypothesis?
- 6- Do you ever read the guidelines for abstract line?
- 7- Have you ever studied any course related to scientific writing guideline?

## Results:

### 1-Abstract writing

The number of the TDs involved in this study was 124 (73 were for Master and 51 for PhD degree). Abstracts and summaries in these TDs were studied carefully and according to the standard guidelines of writing abstracts the result was as followings:

#### *Abstract or summary*

It was found that the number of TDs which contained the heading summary was 87 while the other 37 held the term abstract.

#### *Abstract writing*

The results exhibited that all TDs didn't fulfill the standard instructions for correct abstract writing. The results showed that:-

- 1- All TDs had abstract or summary in the beginning as a front page before the other contents.
- 2- All the data under the summary term were tend to be abstract rather than summary.
- 3- Three TDs wrote the abstract in one paragraph while the others contain two to 14 paragraphs. However 41 TDs abstracts were written in more than two pages.
- 4- The number of words in abstract was between 391 and 2607.
- 5- Twenty one TDs abstract used abbreviations within the abstract text.
- 6- Two abstracts used references citation in the text.
- 7- Only six abstracts mentioned the studied "problem" while the others didn't referred to the problem by any mean.
- 8- Seventeen abstracts showed few lines as introduction while the majority (107) didn't.
- 9- Aim of study was mentioned in only 82 TDs in this study.
- 10- The hypothesis was reported in two TDs only.
- 11- No TDs mentioned the place of work in the abstract.
- 12- Fifty two TDs abstract mentioned the "methods" and result " only without referring to other constitutes of abstract text.
- 13- Concerning the "methods" part only 38 TDs referred to all used methods and 59 TDs just mentioned few data about methods while the others (27) didn't.
- 14- All TDs focused on the "results" part more than other parts. All TDs reported the "results" but they varied in the way of documentation of these results. The most important points of the results were noticed in 47 TDs while 74 reported comprehensively all the findings regardless of their importance, and three TDs showed only one main important result..
- 15- The "discussion" part was mentioned in eight TDs only.
- 16- Only 11 TDs reported the "conclusion" part through the

last few lines.

17- Recommendation part was reported in nine TDs only while the majority (115) didn't refer to the recommendations at all.

### 2- Interview result

This study involved 114 postgraduate students (both Master and doctor of philosophy degrees) from different disciplines as mentioned above. All the students agreed to be involved in this study. The results showed as followings:-

- 1- All students gave incorrect definitions for abstract or summary term.
- 2- No any students gave right answer for the difference between the abstract and summary term.
- 3- The student varied in their answer concerning explaining the content of the abstract. However no student was able to list the main contents.
- 4- No student could give any definition for the hypothesis term.
- 5- No one have any ideas about standard guidelines for abstract writing.
- 6- All students had no scientific idea about how to write scientific article.

## Discussion:

This study was performed on different TDs disciplines from different colleges dealing with biological sciences. Biological sciences in this study included biology, medicine, veterinary medicine, pharmacy, dentistry, and agriculture. The comparison between Master and doctor of philosophy students was not taken into account because the main aim of this study was to concentrate on the abstract writing and the difference between abstract and summary term in the TDs. One of the important reasons to do this study was due to the deterioration in writing TDs noticed among postgraduate students accompanied by taking no attention for this problems by authorities. Surprisingly, the results from this study gave a frustrating impression about the situation of TDs writing process in biological sciences.

The study focused mainly on the abstract written in English in order to criticize them with standard guidelines for abstract writing mentioned separately in many places (4, 22, 3, 34, 6, 27, 13). Although some of TDs were written in Arabic, English translated abstract was reported in the end of the TDs according to the University instructions. According to the standard guidelines for abstract writing, the main criteria used for abstract critique were statement the problem, aims, hypothesis, introduction, findings, discussion and conclusion with recommendations.

The results uncovered disappointing notions about the postgraduate students' knowledge in abstract writing process. All students were unable to differentiate between the meaning of abstract and summary term. They consider that both terms hold the same meaning but they are only linguistically differing. Hence the result showed that the majority of students fixed the term summary instead of abstract regardless of their

knowledge with the differences between them. Interestingly all students put the abstract or summary page in the front of the TDs. That is not because they have well awareness about the correct rules but because they blindly acquired or inherited this style from previous students. Moreover, through the interview, the students also confirmed their illiteracy with using abstract or summary term and they showed marked confusing in using them in their scientific writing; they insisted that both terms have the same meaning. However when those students were informed with the differences between the two terms they felt astonished and appreciate the new information to enlighten their way to write their next abstracts in correct self expressed way. Not only Iraqi students show confusing in using abstract or summary term in their article, other studies from different countries confirmed the problem of that confusion (6, 25, 27) even in natively speaking researchers (5, 28). The students must realize that the term “abstract” is talking about any detailed concept in well readable nutshell while summary is simply short form of that entire subject. Abstract is of the entire chapter while summary can be of any of the parts of the chapter. Abstract is usually pointed after the title and before the body of the article body whereas a summary frequently is fixed in the end of the book or an essay (24, 25, 27). A nice high resolution photograph can give well description to differentiate between abstract and summary; that little size photo will contain all the details in that wide sight, therefore this photo contains all concise and accurate details but in minimize size and this represents the accurate abstract which can represents all article components in few lines. Whereas the description of that sight, by a person to another or through writing brief impression about this sight, will represent the summary because it will give the overall idea about the object in a short brief text but not in precise and concise knowledge as the photo gives. Abstracts can be described by other example; the advertisement leaflets usually show a little picture for specific item such as bed room furniture to get the satisfaction of the customer, hence if the customer admires the show, he/she then go to the shop to see the full details depending on what was shown in the picture.

Another disappointment noticed within TDs was no abstract had been found to be written to fulfil the standard guidelines for abstract writing. What was written under the term summary in 87 TDs, tended to be involved under abstract term rather than summary. The data as far were not in compatible with the summary written instruction as were in agreement with abstract requirements although all those data were lack to the full abstract writing guidelines. This is another confirmation for the situation of weak TD writing skill among postgraduate students; they didn't know that experimental research article must hold abstract but not summary (4, 22, 3, 24, 6, 18,19, 27).

The other criterion for abstract writing is the number of paragraph and number of words that must be within. The result exhibited that very few (3) TDs involved abstract with one paragraph while almost all TDs showed more than two paragraphs and in some time the number reach to 14. Although

all standard guidelines for abstract writing insist to write any scientific abstract with one rigid paragraph this study proved that most postgraduate students didn't care about this point. The students tended to write what they like but not what the scientific writing needs. It seems that the student missed an important truth that the abstract should parallel the body of the paper in content and order and aims to give the reader precise and concise knowledge of the entire article in short well organized abstract. If the abstract is long the reader will become weary of read that abstract in full and then neglect the entire article (20, 21, 10).

Concerning the abbreviations, hopefully only 21 TDs mentioned them, and references citation was noticed in two cases. The guidelines for abstract writing recommend strongly not to use abbreviations and citation in abstract text, however, from the experience with those students writing style, it seems that the students didn't cite references in their TDs because they tended to follow these guidelines at all but just they wrote abstract in that way according to their own desire. To prove that, the other criteria for abstract writing were still deficient in most TDs such as introduction which mentioned in 17 TDs only and the conclusion part written in 11 TDs while suggestions or recommendations part was found mentioned in nine TDs. These findings definitely refer to the lack of knowledge and skill in TDs writing process among Iraqi biology postgraduate students. This is clearly detected during the interview with students who confirmed that conclusion and they confessed that they had no idea about the content of rigid abstract.

Surprisingly all TDs abstracts didn't refer to the place of doing the project. Even the students in their reply about this matter they claimed that place of research performing is not important to be mentioned in the abstract. This problem, although this is not the concern of this article, was not noticed in the abstract only but it was detected in the method chapter as well; about one half of TDs didn't document the research working place. This finding means that the postgraduate students didn't care about the place of work in spite of the importance of that in one hand and they didn't bear in their mind what is the meaning of working place and what it refers to in another hand; even the students who mentioned research performing place in method chapter they didn't mention that in the abstract, and this definitely makes another problem in abstract writing. As mentioned above the abstract must be a small size photo represents the entire activities in the research article and must include documentation of working place (27, 36).

Despite the importance of “methods” part in the abstract content the result displayed that only 52 TDs mentioned that vital part which means that more than a half of TDs lack this part. Moreover the results uncovered that although those 52 TDs mentioned the methods used in the study but most of them wrote the methods incompletely or just reported the main methods and ignored other important procedures. It is of interest to say that how can anybody understands and evaluates any article without knowing little about what was

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done and what procedures used in that work (27,10). Again when students were asked about that defect they mostly replied that abstract should involve mainly the findings of the research whereas the methods might or might not be mentioned as the reader can go to “methods chapter” if the article is of interest.

The main content of the abstract was found to focus on the “result” part in all TDs indicating that postgraduate students thought that the main function of the abstract chapter is to document the findings mainly. This is in agreement with the belief of the interviewed student who confirmed this finding as they believed that the main role of abstract writing is basically to demonstrate findings of the research. In addition, the style of findings documentation in the “abstract” was varied widely among these TDs. Some students reported just the main results and others listed the most findings while more than a half of them mentioned all the obtained results to compose one or two pages. Minimizing the picture of the results or exaggeration in showing them created a vital problem in abstract writing among postgraduates. The interview confirmed that and found out that students were neither informed with abstract writing manual nor they had tried to educate themselves with how to write scientific article.

Reporting the discussion part within the abstract was rarely noticed in TDs. Although eight TDs mentioned one or two sentences about the discussion but they didn’t represent real discussion; students just added few words as a discussion to justify their findings rather than give the value of them. Students during interview claimed that in abstract there is no difference between discussion and conclusion. These frustrating results may give wrong impression about the quality of Iraqi

research.

Only two TDs mentioned the hypothesis within their abstract chapter. Moreover all the students when they were interviewed they confessed clearly that they were not familiar with the term hypothesis even they couldn’t define the term (4, 22, 3, 27). Despite most standard guidelines for abstract writing do not oblige researchers to mention the hypothesis within the abstract, the style of rigid abstract strongly needs to write hypothesis as important part of abstract, this will give clear idea about the thinking level of the researcher.

“Abstract” chapter must be written carefully with high attention in order to become like a high resolution small size coloured monitor which gives a nice view for the entire article. Almost all scientific literatures concerning the process of scientific article recommend and stress to apply the correct and standard guidelines for abstract writing because the abstract must be a little page can give full impression on all the article contents (26, 10, 27, 13). Writing an abstract without taking the standard guidelines will definitely make that abstract weak, incomplete, non understandable and not well accepted, and eventually reduce the interest of the reader to read the entire article (20, 37, 21).

This study concludes that postgraduate students especially in the field of biological sciences have no information about the standard guidelines for scientific writing, have no idea about the difference between abstract and summary contents and they write their thesis or dissertation through acquired style from previous published TDs. Consequently this study strongly recommends involving postgraduate students in programmed systemic courses with well organized syllabus for how to write scientific thesis, dissertation and articles.

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## كتابة الاطاريح والرسائل العلمية في حقل علوم الحياة: الالتباس في استخدام مصطلحي المستخلص والخلاصة

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### المستخلص:

كتابة المستخلص في الاطروحة او الرسالة او المقالة العلمية لها اهمية كبيرة لتكثيف المحتويات في نص قصير ومقروء ومعبر ذاتيا. يجب ان يعطي المستخلص صورة مقنعة وصحيحة ودقيقة للمقالة العلمية الكاملة. في العراق هناك مصطلحين (المستخلص و الخلاصة) يستخدمهما طلبة الدراسات العليا في العلوم الحياتية بشكل واسع كفصل اول في كتابة اطاريحهم او رسائلهم. يختلف المصطلحان بنمط كتابة النص وبمحتواهما. يفترض ان يتم استخدام مصطلح المستخلص في كتابة المقالات و الاطاريح او الرسائل العلمية بدلا عن الخلاصة. تفترض هذه الدراسة ان هؤلاء الطلبة ليست لديهم المعرفة والمهارة في التمييز بين المستخلص والخلاصة اثناء عملية الكتابة. شملت هذه الدراسة قراءة وتحليل 114 اطروحة ورسالة من مختلف فروع علوم الحياة وشملت ايضا اجراء مقابلة مع 114 طالب دراسات عليا للتحري عن دقة استخدام تلكا المصطلحين ولأخذ فكرة صحيحة عن مدى معرفتهم بالمبادئ الاساسية لكتابة المستخلص. كشفت النتائج ان معظم الطلبة لا يميزون بين المستخلص والخلاصة في كتابتهم ولا يوجد هناك مستخلص مكتوب بشكل صحيح مشيرا الى ان الطلبة ينقصهم المعرفة والمهارة في المبادئ الاساسية لكتابة المستخلص. قام الطلبة بكتابة المستخلص بشكل اعمى عن طريق تقليد نمط الكتابة للطلبة السابقين من دون اي محاولة للتحقق من دقة عملية الكتابة. يجب اعادة النظر في مناهج طلبة الدراسات العليا من اجل انشاء نظام متكامل للكتابة العلمية معتمدا المعايير العالمية.