Report of professional competencies research

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***Abstract*—This document is the report of professional competencies research towards computer science students.The topic of this report is which professional competencies do college students think are important for a computer scientist. We surveyed some college students and used those data to back up this report.**

***Index Terms*—computer science, professional competencies, college students**

I. Introduction

In recent years, the development of computer science is rapidly, and computers has been more and more closely integrated with all aspects of society, and there are more people have begun to choose to study computer science and programmers as their future careers.

Some students of computer majors may also be computer scientists in the future, that is, as top programmers and those who responsible for contributing to the development of the computer industry.

We did this survey to see how students think about what is the critical competence for computer science scientists.

Courses in college help students develop professional competencies in engineering education, including discipline knowledge, thinking skills, technology skills, professional skills and so on.

For college students, it is an excellent way to determine the direction of the study and what's the competencies needed for higher level of programming.

II. Method

We chose to survey since we want to access more data and see what is on students' heads. Furthermore, to have an overview of the situation. Since all the group member is Chinese, so we chose Google Forms and a Chinese website called WenJuanXing, both of them can create a survey.

III. Result

Here are the main questions we used in the survay below.

1) How would you ranking those fundamental professional competencies below?(for a computer scientist) *
2) How would you ranking those core professional competencies below? (for a computer scientist) *
3) What do you think is the ability that distinguishes computer scientists from ordinary programmers? *
4) What professional competencies do you think are most important for a computer scientist?
5) Why do you think these professional competencies are most important?

The expected target of our survey is 30 people. So far, we have received 24 people's answers to the questionnaire, which exceeded our expectations and the overall proportion reached 80 percent.

Below we analyze the answers to the main questions.

A. QUESTION ONE

As for question one "How would you ranking those fundamental professional competencies below?", we have six choices in total for people to rank from. These choices are listed below.

1) Self-awareness
2) Self-management
3) Responsible decision-making
4) Social awareness
5) Relationship skills
6) Technical skills

From the result, we calculated the average scores of these fundamental professional competencies,4.25 scores for technical skills, 3.67 scores for relationship skills, 3.5 scores for self-management, 3.33 scores for responsible decision-making, 2.58 scores for self-awareness and 1.92 for social awareness.

So mostly people think the most significant fundamental professional competencies for a computer scientist is technical skills and the least significant one is social awareness.

B. QUESTION TWO

As for question one "How would you ranking those core professional competencies below?", we have six choices in total for people to rank from. These choices are listed below.

1) Math skills
2) Alogrithm skills
3) Creativity
4) Cross-domain interoperability
5) Cooperation skill
6) Others

We still did some calculations to the average scores of these professional competencies.So the result is 3.17 scores for Alogrithm skills and Creativity, 3.08 scores for Math skills, 2.08 scores for Cross-domain interoperability and Cooperation skill, 0 for others.

We can see from the result that most people think Creativity and Alogrithm skills are more important than other professional competencies in views of college students.

C. QUESTION THREE

For the question "What do you think is the ability that distinguishes computer scientists from ordinary programmers?", we offered some answers as below.

1) Math skills
2) Research Capacity
3) Creativity
4) Comprehension level of computer knowledge
5) Others

After calculation, we found that 8 people support Math skills, 4 people support Research Capacity and Creativity, 7 people support Comprehension level of computer knowledge and only one people think it's the problem solving ability that distinguishes computer scientists from ordinary programmers.

D. QUESTION FOUR

As for the question "What professional competencies do you think are most important for a computer scientist?", we received diverse answers.But the most frequent answers are research capacity and algorithm capabilities, which is similar to the most important core professional competencies in the question two.

E. QUESTION FIVE

As for the question "Why do you think these professional competencies are most important?", the answers we received showed that these professional competencies make scientists being scientists, which means the competencies can help them create new knowledge and boost the development of our society which are closely integrated with computer science.

IV. DISCUSSION AND FUTURE WORK

Based on what we have seen in the results, we agree that the most significant competencies for a computer scientist are technical skills, research capacity and creativity. Other competencies like social awareness are much less important.

If we want to start a new one study based on it, we may chose to study why people think social awareness is least important. We may assume some extreme conditions about a computer scientist without social awareness and see how people would think of it.

A. LaTeX-Specific Advice

Please use "soft" (e.g., `\eqref{Eq}`) cross references instead of "hard" references (e.g., `(1)`). That will make it possible to combine sections, add equations, or change the order of figures or citations without having to go through the file line by line.

Please don't use the `{eqnarray}` equation environment. Use `{align}` or `{IEEEeqnarray}` instead. The `{eqnarray}` environment leaves unsightly spaces around relation symbols.

Please note that the `{subequations}` environment in LaTeX will increment the main equation counter even when there are no equation numbers displayed. If you forget that, you might write an article in which the equation numbers skip from (17) to (20), causing the copy editors to wonder if you've discovered a new method of counting.

BibTeX does not work by magic. It doesn't get the bibliographic data from thin air but from .bib files. If you use BibTeX to produce a bibliography you must send the .bib files.

LaTeX can't read your mind. If you assign the same label to a subsubsection and a table, you might find that Table I has been cross referenced as Table IV-B3.

LaTeX does not have precognitive abilities. If you put a `\label` command before the command that updates the counter it's supposed to be using, the label will pick up the last counter to be cross referenced instead. In particular, a `\label` command should not go before the caption of a figure or a table.

Do not use `\nonumber` inside the `{array}` environment. It will not stop equation numbers inside `{array}` (there won't be any anyway) and it might stop a wanted equation number in the surrounding equation.

B. Some Common Mistakes

- The word "data" is plural, not singular.
- The subscript for the permeability of vacuum μ_0, and other common scientific constants, is zero with subscript formatting, not a lowercase letter "o".
- In American English, commas, semicolons, periods, question and exclamation marks are located within quotation marks only when a complete thought or name is cited, such as a title or full quotation. When quotation marks are used, instead of a bold or italic typeface, to highlight a word or phrase, punctuation should appear outside of the quotation marks. A parenthetical phrase or statement at the end of a sentence is punctuated outside of the closing parenthesis (like this). (A parenthetical sentence is punctuated within the parentheses.)
- A graph within a graph is an "inset", not an "insert". The word alternatively is preferred to the word "alternately" (unless you really mean something that alternates).
- Do not use the word "essentially" to mean "approximately" or "effectively".
- In your paper title, if the words "that uses" can accurately replace the word "using", capitalize the "u"; if not, keep using lower-cased.
- Be aware of the different meanings of the homophones "affect" and "effect", "complement" and "compliment", "discreet" and "discrete", "principal" and "principle".
- Do not confuse "imply" and "infer".
- The prefix "non" is not a word; it should be joined to the word it modifies, usually without a hyphen.
- There is no period after the "et" in the Latin abbreviation "et al.".
- The abbreviation "i.e." means "that is", and the abbreviation "e.g." means "for example".

An excellent style manual for science writers is [7].

C. Authors and Affiliations

The class file is designed for, but not limited to, six authors. A minimum of one author is required for all conference articles. Author names should be listed starting from left to right and then moving down to the next line. This is the author sequence that will be used in future citations and by indexing services. Names should not be listed in columns nor group by affiliation. Please keep your affiliations as succinct as possible (for example, do not differentiate among departments of the same organization).

D. Identify the Headings

Headings, or heads, are organizational devices that guide the reader through your paper. There are two types: component heads and text heads.

Component heads identify the different components of your paper and are not topically subordinate to each other. Examples include Acknowledgments and References and, for these, the correct style to use is "Heading 5". Use "figure caption" for your Figure captions, and "table head" for your table title. Run-in heads, such as "Abstract", will require you to apply a style (in this case, italic) in addition to the style provided by the drop down menu to differentiate the head from the text.

Text heads organize the topics on a relational, hierarchical basis. For example, the paper title is the primary text head because all subsequent material relates and elaborates on this one topic. If there are two or more sub-topics, the next level head (uppercase Roman numerals) should be used and, conversely, if there are not at least two sub-topics, then no subheads should be introduced.

E. Figures and Tables

a) Positioning Figures and Tables: Place figures and tables at the top and bottom of columns. Avoid placing them in the middle of columns. Large figures and tables may span across both columns. Figure captions should be below the figures; table heads should appear above the tables. Insert figures and tables after they are cited in the text. Use the abbreviation "Fig. 1", even at the beginning of a sentence.

TABLE I
TABLE TYPE STYLES

Table Head	**Table Column Head**		
	Table column subhead	***Subhead***	***Subhead***
copy	More table copy[a]		

[a]Sample of a Table footnote.

Figure Labels: Use 8 point Times New Roman for Figure labels. Use words rather than symbols or abbreviations when writing Figure axis labels to avoid confusing the reader. As an example, write the quantity "Magnetization", or "Magnetization, M", not just "M". If including units in the label, present them within parentheses. Do not label axes only with units. In the example, write "Magnetization (A/m)" or "Magnetization {A[m(1)]}", not just "A/m". Do not label axes with a ratio of quantities and units. For example, write "Temperature (K)", not "Temperature/K".

Fig. 1. Example of a figure caption.

ACKNOWLEDGMENT

The preferred spelling of the word "acknowledgment" in America is without an "e" after the "g". Avoid the stilted expression "one of us (R. B. G.) thanks ...". Instead, try "R. B. G. thanks...". Put sponsor acknowledgments in the unnumbered footnote on the first page.

REFERENCES

Please number citations consecutively within brackets [1]. The sentence punctuation follows the bracket [2]. Refer simply to the reference number, as in [3]—do not use "Ref. [3]" or "reference [3]" except at the beginning of a sentence: "Reference [3] was the first ..."

Number footnotes separately in superscripts. Place the actual footnote at the bottom of the column in which it was cited. Do not put footnotes in the abstract or reference list. Use letters for table footnotes.

Unless there are six authors or more give all authors' names; do not use "et al.". Papers that have not been published, even if they have been submitted for publication, should be cited as "unpublished" [4]. Papers that have been accepted for publication should be cited as "in press" [5]. Capitalize only the first word in a paper title, except for proper nouns and element symbols.

For papers published in translation journals, please give the English citation first, followed by the original foreign-language citation [6].

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V. APPENDIX:WORK DISTRIBUTION

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