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 having begun to choose to study computer science and be 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.

In fact, this result is quite different from what employers expected. In his paper, Abelha [1] investigated some of the important competencies expected by employers, in which soft power is more important than professional core competencies. The so-called soft power includes teamwork, communication and language skills. The results of this questionnaire reflect the disconnect between ability training and social needs in the school education process. Considering that the group targeted by this survey is school students, everyone generally puts the soft power mentioned above at a very low priority, which to a certain extent leads to the problem of employment difficulties. Therefore, how to change the concept of training to improve the soft power of students and how to evaluate the soft power in education are all problems that need to be solved in the process of computer science education.

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.

REFERENCES

[1] Abelha, M.; Fernandes, S.; Mesquita, D.; Seabra, F.; Ferreira-Oliveira, A.T. Graduate Employability and Competence Development in Higher Education—A Systematic Literature Review Using PRISMA. Sustainability 2020, 12, 5900.

V. APPENDIX:WORK DISTRIBUTION

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