CONFERENCE PROCEEDING

Study on Python as a tool in Education of Cryptography: Awareness among Secondary School Students

Ahmad Shauqi Afif Adnan, *Siti Munirah Mohd, Shafinah Kamarudin, Nurhidaya Mohamad Jan, Hatika Kaco

Kolej GENIUS Insan, Universiti Sains Islam Malaysia, Bandar Baru Nilai, 71800 Nilai, Negeri Sembilan, Malaysia
[1]Faculty of Computer Science and Information Technology, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia

**smunirahm@usim.edu.my*

ABSTRACT

Currently, an increase in the use of Python as the embedded scripting syntax in many well-known programs can already be seen, hence the development of Python-based learning resources for cryptography education deserves more attention. This study was conducted to determine the level of awareness among secondary school students about Python as a tool in the education of cryptography, which mainly refers to the encryption technique used to secure our data in the digital age. This study has been conducted through purposive and convenient sampling among secondary school students from selected boarding schools. The age of the students involved in this online survey is between 12 until 17 years old. Average students are aware of Python as a fundamental programming language and the necessity of cryptography as data protection in the digital platform, according to the survey's findings. In conclusion, the findings of this study have gotten great reviews. Most students agreed that Python can be applied as an instrument for the education of cryptography.

Keywords: *Python, cryptography, education 4.0, programming*

INTRODUCTION

In this digital era, computer programming for tutoring purposes is becoming more prominent everywhere throughout the world with the expansion of computer and information technologies. According to AbuEl-Reesh *et al.* (2018), the use of these coding platforms in the educational process as an additional tool for the formation of professional competencies allows students to participate more actively in the process of the practical application of existing knowledge in a more informal and convenient environment for further education. Python is a high-level, interpreted, general-purpose dynamic programming language with a focus on code readability. Python's syntax makes it easier for programmers to code in more than Java or C++. As a result, it has become the commonly used programming language for cryptography (Vidhya, 2018). Cryptography modifies the arrangement and presentation of data so that it is incomprehensible to a stranger. Due to a lack of awareness, such cryptography has caused individuals to not secure information, and hackers have been able to modify information and access data to commit crimes, which has been disregarded and considered a severe risk. This approach is extremely useful and secure in terms of achieving message confidentiality (Meena *et al*., 2019). Therefore, the main objective of this study is to identify the level of awareness among secondary school students about Python as the instrument to learn cryptography education.

MATERIALS AND METHODS

Figure 1 illustrates the flowchart of the methodology used to carry out the objective of this study involved three stages. The first stage is the development of items of the questionnaire, which consists of four (4) questions; two (2) questions are focusing on Python as a basic programming language and two (2) other questions consist of cryptography education elements. The questions are arranged in order and selection answers are provided. The second stage is a survey. The items of the questionnaire are distributed online among secondary school students in three selected boarding schools around Selangor. The method used during this survey is purposive and convenient sampling. In the final stage, the data collected from each question are then analyzed based on the feedback of the students.

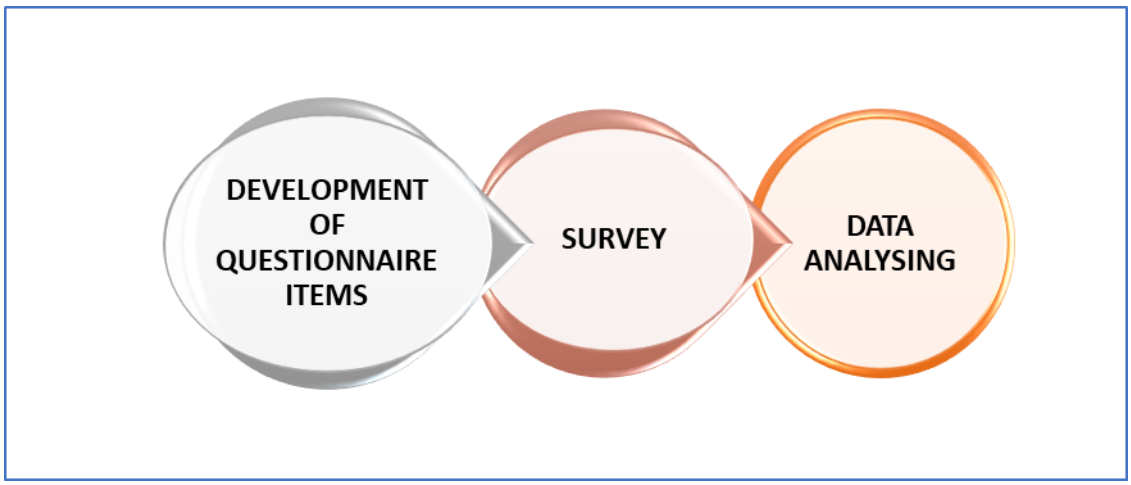
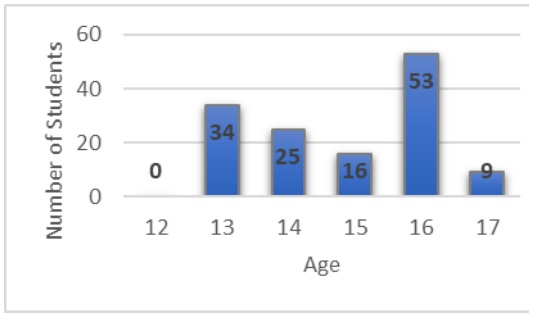


Figure 1. Flowchart of Methodology

RESULTS AND DISCUSSION

Data were prospectively collected from the selected boarding school in which 137 students answered the online survey. The results are shown that most students realize Python as a basic programming language and acknowledge its functionality in cryptography learning. Figure 2 (a) and Figure 2 (b) show the number of students involved in an online survey by age and gender. From the data students age 16 years old and male gender, most participate in this online survey.

(a)



(b)

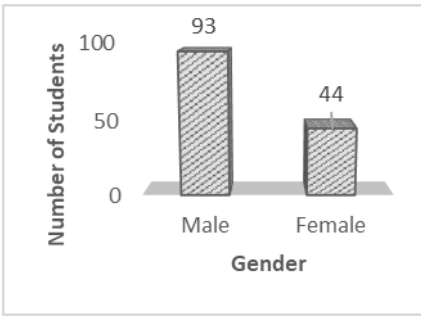


Figure 2. Student population by a) age and b) gender

There are four items of the questionnaire in the online survey, question 1 (Q1) is about the knowledge of programming, question 2 (Q2) is about the knowledge of Python as the programming language, question 3 (Q3) is about the knowledge of Cryptography,

and question 4 (Q4) is about the importance of Cryptography. For question Q1, the result showed that 66.4% of students are aware of programming skills and 24.1% are opposed while 9.5% are not sure. For question Q2, the result showed that 57% of students acknowledge Python as a programming language and 35% are opposed while 8% are not sure. For question Q3, the result showed that 49.6% of students are aware of education of cryptography and 37.4% are opposed while 19% are not sure. For question Q4, the result showed that 46% of students acknowledge the importance of Cryptography, and 34.3% are opposed while 19.7% are not sure.

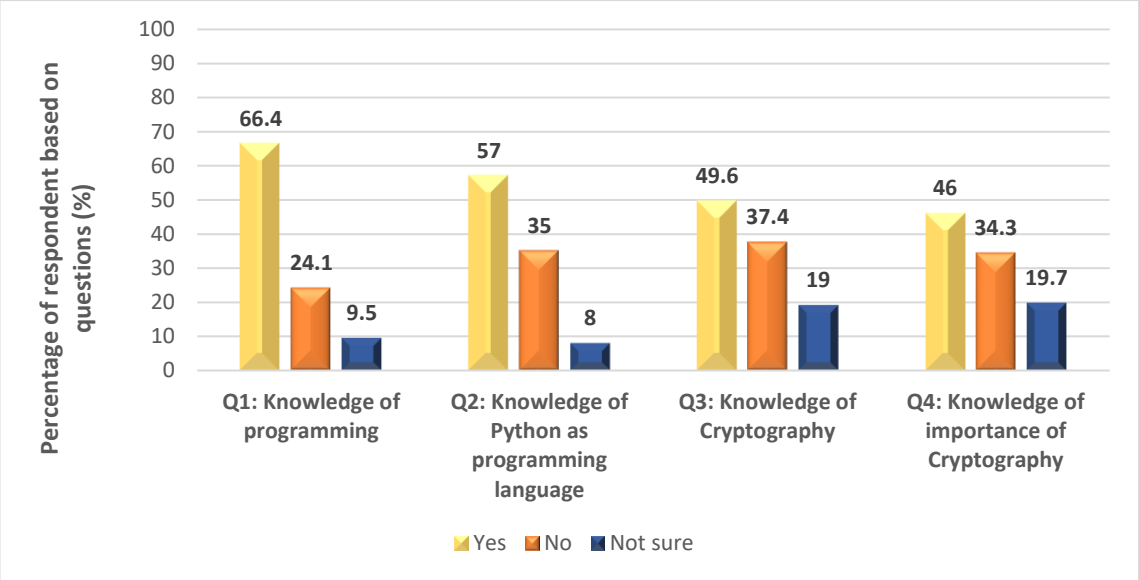


Figure 3. Students' Response on Awareness of Python Programming as a Tool in Education of Cryptography

CONCLUSION

In summary, this study shows the average of secondary school students that acknowledge programming skills and are experienced with Python as a basic programming language. Other pupils, however, are unclear of the usefulness of Python programming in cryptography. In a nutshell, students should be able to learn with Python's embedded scripting syntax as a tool to deliver the concept of cryptography and its usefulness in the technology era.

REFERENCES

AbuEl-Reesh, J. Y., & Abu-Naser, S. S. (2018). An Intelligent Tutoring System for Learning Classical Cryptography Algorithms (CCAITS). International Journal of Academic and Applied Research (IJAAR), 2(2).

Meena, Y., Verma, R. K., Sankhla, M. S., & Kumar, R. (2019). Secure Cyber Network to Sharing Information through Cryptography & Stenography. Eng Technol Open Acc, 2(5), 1-5.

Vidhya, D. S. (2018). Network Security using Python. International Journal of Scientific Research in Science, Engineering and Technology IJSRSET, Vol. 4. (4), 1567-1570.