

Application of computational thinking methods to increase the effectiveness of communication with Generation Z

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Abstract

Generation Z refers to anyone born between 1995 and 2012. They will start a career in areas of their choice that mostly use devices that process, calculate and perform operations based on instructions provided by software or hardware. According to a research conducted by David and Jonah Stillman, 65% of Generation Z prefer a private workspace over a shared environment like an open office. The Generation Z's communication method is different due to environmental factors especially in homes and schools. This generation has surfed the Internet, used mobile communication tools and social media to fulfill their daily needs since elementary school. In order to improve the effectiveness of communication in which it is the basis of good relationships between different generations, a method that fits into the Generation Z informal learning method needs to be studied. This article proposes application of computational thinking methods to solve Generation Z open communication issues. Computational thinking is a method of solving problems through a process that is customized from the information science field. It involves the process of identifying problems and completing them in a form that can be implemented by an information processing agent or computer. Computational thinking involves eight major concepts: abstraction, decomposition, pattern recognition, algorithms, logical reasoning, evaluation, data representation and data analysis. These concepts are intended to be applied in the communication process with Generation Z.

Keywords: Generation Z, computational thinking, communication, computer science, problem solving

Executive Summary

The higher education system in Malaysia has grown rapidly and steadily over the past few decades. Over the past ten years, the number of enrollment students from the Generation Y.1, now 24 to 28 years old, has grown significantly. There were significant increases in global recognition in various aspects such as publications, research findings, patents, institutional quality and QS ranking, as well as a sharp rise in the number of international students. This achievement is a result of the efforts and innovation of the academic community in Malaysia, the contribution of the private sector and large investments by the Government.

However, referring to the 2015-2025 (Higher Education) Malaysia Education Development Plan [1] under the challenge and expectation topics, it is stated that employers report that some graduates from local universities do not master critical thinking skills and communication, as

well as language skills, especially English. Therefore, there is a mismatch between supply and demand for graduates. This mismatch is expected to be more difficult to overcome due to the growing expectations following technological developments that change the form of industry and the type of work offered. In this regard, prospective graduates in Malaysia need to be educated and prepared for the increasingly challenging future, not only equipping them with sound thinking skills and basic oral communication, but also strengthening resilience to explore new opportunities.

The earliest Generation Z who pursued studies at institutions of higher learning (IHE) will be 23 years old this year. Critical thinking skills that are not capable of mastering Generation Y will continue by Generation Z. As Generation Z grows, statistics show that Malaysian residents living in urban areas are approaching 70%. Urban areas with good infrastructure provide a great deal of dependence on mobile device communications that provide greater Internet browsing capabilities. Besides, Generation Z has gone through an era where families and communities are largely aloof with their respective devices. Furthermore, they are known for their short attention span — 8 seconds — and their love of using symbols and emoji to communicate. This impacts them into choosing cyberspace rather than real life due to the ability to perform various activities in social media by using only smartphones or tablets. According to a research conducted by David and Jonah Stillman, 65% of Generation Z prefer a private workspace over a shared environment like an open office [2].

Therefore, a thorough study is needed to overcome the problem of Generation Z closed communication and to find a solution on how to involve them with various activities that require them to be physically present. In order to improve the effectiveness of communication in which it is the basis of good relationships between different generations, a method that fits into the Generation Z informal learning method needs to be studied. In this paper, application of computational thinking methods is proposed to solve Generation Z communication issues and to make them to be more confident in two-way communication outside of the smartphone environment.

Introduction

Computational Thinking (CT) was first introduced by Jeannette Wing. In this ground-breaking paper, Wing suggests that CT should become like reading and writing, a necessary skill for everyone not just Computer Scientists. CT is a problem solving methodology that uses the concepts of Computer Science to solve problems. The term "computational thinking" is defined as "solving problems, designing systems, and understanding human behaviour, by drawing on the concepts fundamental to computer science." [3] By definitions: *computational* -- using or relating to computers and *thinking* -- the process of considering or reasoning about something.

Therefore, computational thinking (CT) is a method of problem solving through a process adapted from computer science. It involves the process of identifying problems and completing them in a form that can be implemented by the information processing agent. CT allows us to develop skills and techniques to help us solve problems effectively, with or without the aid of a computer. CT is not 'thinking like a computer' – computers are not capable of thought. Rather, it is learning to think in ways which allow us, as humans, to solve problems more effectively and, when appropriate, use computers to help us do so. CT commonly involves eight main concepts;

abstraction, decomposition, pattern recognition, algorithm, logical reasoning, evaluation, data representation and data analysis.

Abstraction is a process of removing unnecessary detail, simplifying things or identifying what is important. It allows us to manage complexity. Abstracting leads to a simple view of the main idea of a thing. *Decomposition* concept is a process of breaking a problem or system down into parts. It sometimes involves breaking those parts down further. Decomposition helps us solve complex problems and manage large projects. *Patterns recognition* process spots similarities and common differences. By identifying patterns we can make predictions, create rules and solve more general problems. It is also a way of quickly solving new problems based on previous problems we have solved. This is also called generalisation. *Algorithms* is simply steps and rules in solving problems. In other words, it is a sequence of instructions, or set of rules, for performing a task. *Logic reasoning* is to help us make sense of things during analysing and predicting. It helps us establish and check facts. *Evaluation* is concerned with making judgements. It is something we do every day: we make judgements about what to do and what we think based on a range of factors.

Data representation is depicting and organizing data in appropriate graphs, charts, words, or images. *Data Analysis* is making sense of data by finding patterns , developing insights or highlighting information that is meaningful and relevant.

Research Methodology

In order to realize this study, two groups of lecturers will be created randomly, i.e. the case and control groups. Each group consists of 5 people. Both groups conducted different courses of study in the semester. For only the case group, CT training will be conducted for three hours. This is done outside of lecture time. At the end of the semester, both groups will be given subjective understanding questions that require their students, Generation Z to communicate with the lecturers. Results will be compared to both groups.

Expected results

The lecturers in the case group who has been trained on the CT will perform better in communicating with the Generation Z and will give a better result compared to the control group. If this is realized, the communication skill of older generations need to be trained using computational thinking method.

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