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Enhancement of Teaching Toolkits Under the Thailand 4.0:Optimum Design Concept for Internet of Thing

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***Abstract*:** *- Thailand has a policy of Thailand 4.0, it has increased its role in self-innovation and international competition, which has put pressure on the education sector in Thailand. The emphasis in education is on the transfer of knowledge that already exists, it is not a guarantee to create of Thailand's Innovation Technology in the future. The race of competition to create IOT toolkits to be used in teaching and learning, whether it's in PC, laptop, tablet to including robotic fundamental. Private companies play a role in offering standards and competition in the sale of their technology, but the problem is that the variety of products available in the market and in institutions is too confusing. The knowledge base will be the basis for teaching and learning to select and design the IOT toolkits equipment according to the needs. It is important in the first rank of this research. The result is that the parts of the equipment used are 3-5 devices and supporting software has long range in algorithm cover, which is in life time use in long life in 3-5 years.*
This research is an introduction to the design of teaching toolkit. To be able to developed it for: a long time; cheap and maximum coverage programming efficiency.

Keywords: *Thailand 4.0, IOT, Coding, Computational Thinking, Toolkits, Teaching, Learning, School, Thailand*

1. Introduction

Thailand 4.0 is an economic model that aims to unlock the country from several economic challenges resulting from past economic development models which place emphasis on agriculture (Thailand 1.0), light industry (Thailand 2.0), and advanced industry (Thailand 3.0). These challenges include "a middle income trap", "an inequality trap", and "an imbalanced trap". [1]

The Thailand 4.0 development plan is focused on 10 targeted industries, which can be divided into two segments; developing existing industrial sectors by adding value through advanced technologies for five industries: Next-Generation Automotive; Smart Electronics; High-Income Tourism and Medical Tourism; Efficient Agriculture and Biotechnology; and Food Innovation. The government has targeted five additional growth engines to accelerate Thailand's future growth: Automation and Robotics; Aerospace; Bio-Energy and Bio-chemicals; Digital; and Medical and Healthcare.[2]

In the Asia-Pacific region's economic competitiveness to the global level, education reform is needed to produce many graduates who have the skills and knowledge to grow in high tech industries and the environment transnational work. In apart from structural reforms and policies, Thailand economic competitiveness also needs to change for integration schools or curriculum to improve the education infrastructure system prior to the implementation of other reforms. Because, Thailand's workforce is inconsistent: creative; innovative; scientific; mathematical; engineering and technical knowledge English language to work in a multidisciplinary works.[3]

For this reason, Coding and Computational Thinking are important to present teaching. Language programming or programming is a core part of the curriculum in elementary and secondary schools.[3] "We have to lay the groundwork for confidently navigating the digital world at a young age. Young people have to be

capable of doing more than just using the apps on their smart phones. They should also know a programming language, because that's the only tool that will allow them to make their ideas reality," Dr. Werner Struth, a member of the Bosch board of management, said in 2015.[4]

2. Iot History

IOT is "Things having identities and virtual personalities operating in smart spaces using intelligent interfaces to connect and communicate within social, environmental, and user contexts"5

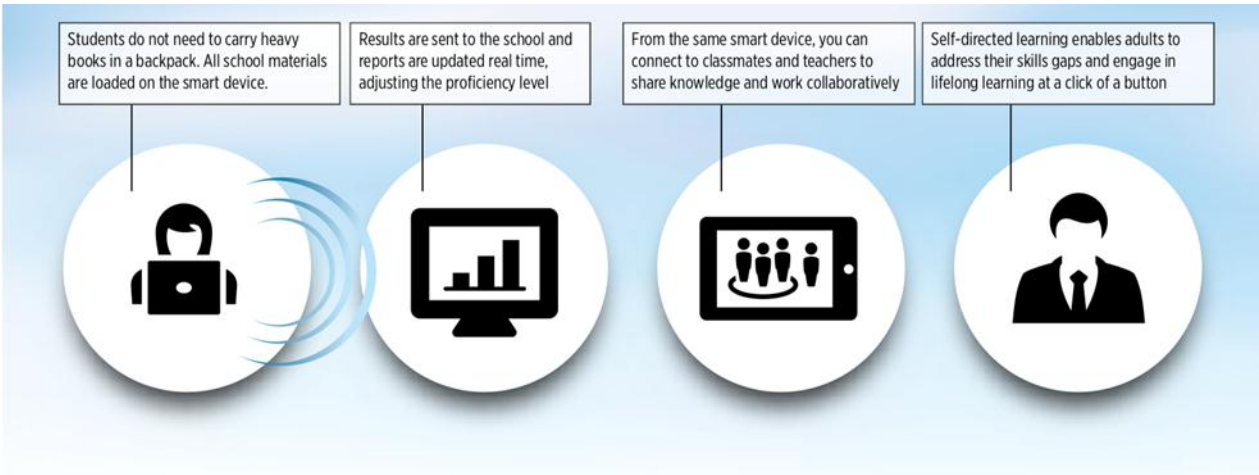

Fig 1 Example IOT Education Applications[7]

The Internet of Things was coined by Kevin Ashton, a British technology pioneer working on radio-frequency identification (RFID) who conceived a system of ubiquitous sensors connecting the physical world to the Internet. Today, the Internet of Things connects physical devices embedded with electronics, software, sensors, and actuators to the cloud and to each other. Devices communicate through different protocols and many, such as MQTT, were designed to tolerate intermittent connections and reduce network bandwidth requirements. All IoT communication must be secured using preventive security mechanisms and best practices, like device identity management, encryption, and access control as well as device auditing and monitoring. Although connected things, the Internet, and secure connectivity are required to create IOT applications, the value is in closing the gap between the physical and digital world in self-reinforcing and self-improving systems.[6]

In education, mobile-enabled solutions will tailor the learning process to each student's needs, improving overall proficiency levels, while linking virtual and physical classrooms to make learning more convenient and accessible. Mobile education solutions have already been shown to improve learners' proficiency rates and reduce dropout rates, and have the potential to enable, by 2017.[7]

3. Concept

Thailand country has to develop in teaching and learning to respond to Thailand 4.0. There is a need to adjust curriculums and teaching aids to improve the ability of students in elementary and secondary schools. The teach toolkits that need to be able to training coding and computational thinking. Those tools need to be responsive to the costs that the school will have to pay. The developments of many companies are offering to push the standardization of the tools and several of difference in the tools that companies offer is confusion in teaching different.

In this concept Experiment, The first-level study of the tools used to study the age of the company's products is sold in Thailand and is supported by continuing education abroad.

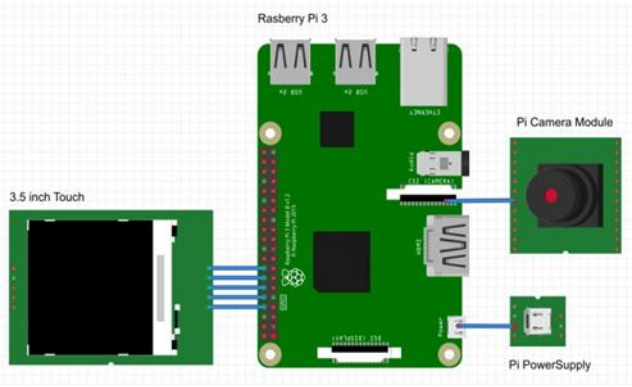

Fig 2 Concept toolkits

In the next step, we will take a look at the variety and support of programming software to see the value and ease of use for teaching and learning.

At this stage, it is possible to encapsulate the toolkits and types of products initially to be used as a tool for further action.

4. Setup Experiment

Step-up involves all process from that Optimum Design Concept for Internet of Thing from Concept toolkits design experiment:

1. Find information to collect important theories and designs, as well as find information on the product you are looking for.
2. Bring the prototype to use and build the selected body style and functional.
3. Operating the Code using software for system testing.
4. Take the best design from Decision from Specialist team observer. (IOT Professional expert)
5. Summary of the prototype model to be built to work in the next research.

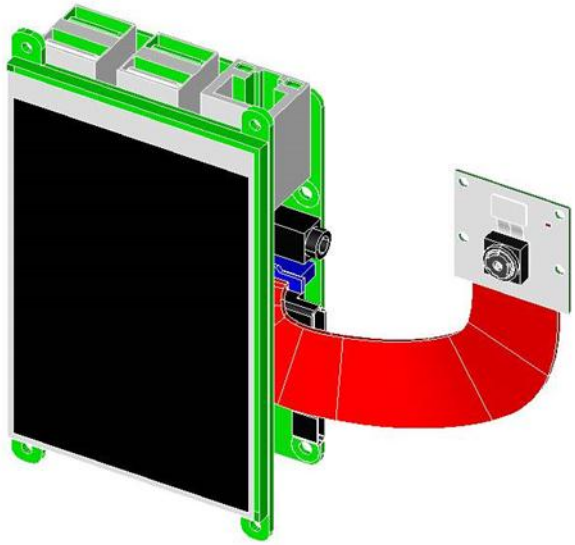

Fig 3 Concept toolkits in 3D image

5. Conclusion

Based on the results of the experiment, we will be able to select the devices that can be used to encode the software used to program the device. The device can be used as a basic device, which will be used in mobile phone.

However, the device is available under the Android Things operating system, which can be used on selected circuit boards, as well as options for using the Python language. Special and support views of the company can also create precise boundaries for page writing.

Future considerations may look at how the next five years are going to take place for future generations and production lines of IOT Product.

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