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Research paper

The building OER in okmindmap for innovative teaching and learning

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Abstract

Open educational resources (OER) are important because they help improve education across the globe, especially for developing countries. In this paper, we introduce a WebQuest that was built in OKMindmap style as suitainable OER model. We focused on how to deploy several skills of 21st century namely collaboration, communication, critical thinking, computational thinking and creativity in teaching and learning using online tools such as OKMindmap, Scratch, Youtube and Facebook to high school teacher practice in Can Tho University of Viet Nam. In the current study, OER in one OKMindmap page was built and used for learning and teaching. WebQuest in OKMindmap style was made by teachers as an assignment for 140 students in their coursework. The students' learning products in OKMindmap style called Big Book are shared to Facebook for helping our community in their long life learning. A case study investigated is a Mekong River WebQuest which asks student to do Scratch projects to present their knowledge and concerns about Mekong Delta dealing with the climate change problem and Mekong river pollution nowadays. This work shows how to apply our suggested WebQuest model effectively in schools as OER to make the teaching and learning more creative and happier for the young generation.

Keywords: *OER; WebQuest; OKMindmap; Scratch; ICT in education*

1. Introduction

Open educational resources (OER) are any type of educational materials that are in the public domain or are released with an open licence, and that can therefore be copied, used, adapted and re-shared freely and legally. The 2012 Paris OER Declaration was adopted at the 2012 World OER Congress, held at the headquarters of UNESCO in Paris, and it recommends that governments, within their capabilities and powers: [1]

-Foster awareness and use of OER;
-Facilitate enabling environments for use of information and communication technologies (ICT);
-Reinforce the development of strategies and policies in OER;
-Promote the understanding and use of open licensing frameworks;
-Support capacity building for the sustainable development of quality learning materials;
-Foster strategic alliances for open resources;
-Encourage the development and adaptation of OER in a variety of languages and cultural contexts;
-Encourage research on OER;
-Facilitate finding, retrieving and sharing of OER;
-Encourage the open licensing of educational materials produced with public funds.

Innovative education [2] is necessary to help students to reach their full potential. Higher education institutions should serve the long term intellectual needs of the student by providing new material to help the student to gain new insights or opening new channels of intellectual stimulation or enhanced student's essential and creative thinking power. Innovative teaching is a necessity for all teachers in order to meet the 21st century educational need. However, teachers' competency for innovative teaching is a key factor influencing innovative teaching performance [3, 4, 5].

Innovative teaching method should be mind maps, which is a simple technique for drawing information in diagrams, instead of writing it in sentences. The diagrams always take the same basic format of a tree, with a single starting point in the middle that branches out and divides again and again. The tree is made up of words or short sentences connected by lines. The lines that connect the words are part of the meaning. Mind maps are also very quick to review, as it is easy to refresh information in student's mind just by glancing once. Mind maps can also be effective mnemonics and remembering their shape and structure can provide the cues necessary to remember the information within it. They engage much more of the brain in the process of assimilating and connecting facts than conventional notes. The key notion behind mind mapping is that students learn and remember more effectively by using the full range of visual and sensory tools at their disposal. Pictures, music, color, even touch play a part in the learning armory, since it helps to recollect information for long time [6].

OKMindmap [7] is a good innovative collaborating environment for learning and teaching. In this paper, we propose a way to build the OER in form of OKMindmap to use in teaching and learning. WebQuest [8] is built in OKMindmap style for teacher using to flip the classroom. Big Book is a name we suggested to mention

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about the porfolio in OKMindmap style that students create during their learning. So, our model composes three main components as WebQuest, Big Book, and Scratch studios. Youtube videos, Facebook, Geogebra and Khan Academy and some other MOOC are also important for making our model the most effectively.
For conducting this study, the following research questions will be considered (1)-How do students and teachers benefit from OER designed by OKMindmap? (2)-Is this OER model combining WebQuest library, Big Book library with Scratch Studio feasible in developing country like Vietnam? The next section of this paper mentions about the literature review. The third one explains about the methods used to organize the research. Findings and conclusion with suggestion end this paper..

2. Literature Review

2.1. Open educational resource (OER)

OER are any type of educational materials that are in the public domain or introduced with an open license. The nature of these open materials means that anyone can legally and freely copy, use, adapt and re-share them. OER range from textbooks to curricula, syllabi, lecture notes, assignments, tests, projects, audio, video and animation. For learning about aeronautical engineering from a science whiz at the Massachusetts Institute of Technology (MIT), learners can check out lecture notes and videos from MIT courses. The vision for a health OER network in Africa is an OER initiative started by experts in health science institutions across Africa to openly share health education materials. These materials are used by health professionals in Africa to enhance their knowledge and training, as well as by students and educators around the world. Another OER started by the Delft University of Technology in the Netherlands includes courses on clean water technology for developing countries. These resources have been updated by universities in South Africa, Singapore, the Antilles and Indonesia to include information on water treatment processes from their regions, making a collaborative resource on drinking water engineering available online to anyone who wishes to learn more" [9].
OER help improve education across the globe. They are important for developing countries, where many students may not be able to afford textbooks, where access to classrooms may be limited, and where teacher-training programs may be lacking. They are also important in wealthy industrialized countries, where they can offer significant cost savings. For students, OER offer free access to some of the world's best courses and even degree programs. They can also offer huge cost savings as alternatives to expensive textbooks. For teachers, ministries of education and governments, OER provide free and legal access to some of the world's best courses. Educators can then adapt them to local languages and cultures and use them as a basis for innovation. Free information is a fundamental human right, and OER make it possible for people of all ages and backgrounds to learn more about the world around them and access the tools they need to improve their lives and livelihoods[10].
The importance of OER has been widely documented and demonstrated recently. From conferences and declarations dedicated to the support of OER to the development of resource repositories and other services, there has been a general awakening in the learning community [11].

2.2. OKMindmap

Since its birth in 1970s by Tony Buzan, a mind map has been regarded as an effective organizational thinking tool. In recent years, mind maps have become a popular teaching tool and being developed along with the advent of technology. A mind map is way of describing a subject, starting from the main subject or image, and radiatingly propogating with similar or related words or images to the outside. It uses different colours and images for the description, and when presenting, mind map is clearer and easier to understand the subject because it is very similar to how the human brain recognises the subject.
OKMindmap has been available as an open service since 2011 by Jinotech in Korea, and is used by many educational and business people and institutions. It can be used on web browsers and it is possible to insert various nodes. The mind map can be displayed as part of the Internet information using images, web links, videos, web pages, and iframes. In addition, the visually displayed mind map can be transformed into other shapes, such as web-based presentations, sunburst charts, organizational diagrams, fishbone, square charts, etc. The contents of figure 1 and figure 2 show that the mind map containing various types of nodes and the same mind map are converted into various visual forms. By linking the mind map nodes to Moodle's learning activities, resources, and functions, learners and instructors can access Moodle's learning functions through a very simple interface.
OKMindmap allows its users to collect and connect information from various online sources. Users can access and update their mind maps for their own purposes. One notable benefit of OKMindmap is its ability to enable the learners to share information, which is supposed to enhance collaboration and facilitate the learning process.

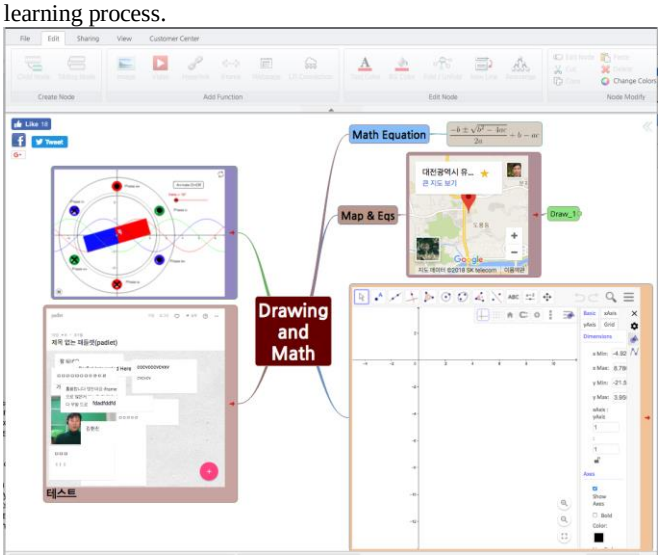

Fig. 1. OKMindmap with various nodes

OKMindmap supports collaborative learning activity. At the same time, up to 40 students can access the same map using their web browsers. It also supports SNS (Social Networking Systems) integration. It can bring Facebook, Twitter and Delicious information as a node. Besides that, OKMindmap can be a content delivery tool and it can be used as a learning activity or a knowledge portal. OKmindmap is an innovative tool for drawing a mindmap. Using mind mapping with OKMindmap requires the combination of higher-order thinking skills and technological advances. As such, the use of OKMindmap is believed to be able to promote the development of four super skills including communication, collaboration, critical thinking and creativity. These are considered as essential skills to be possessed by the 21st century citizens. As for the learners to possess those four skills, teachers play a more crucial role than ever. They are expected to improve their teaching methods [12] and one of the ways is to harness the advances of information technology [13].

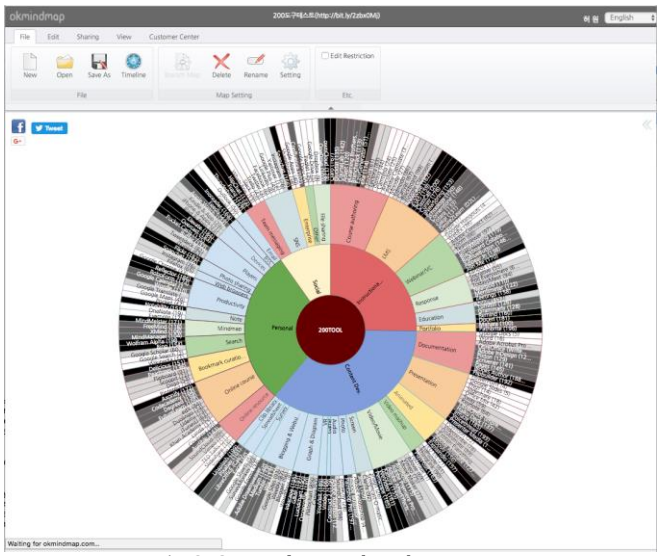

Fig. 2. OKMindmap with sunburst view

Although mindmaping has been claimed to be a powerful thinking tool and OKMindmap has been developed to facilitate mindmaping, little research has been conducted into the use of OK mindmap in education. This study seeks to address this gap. It explored the effect of OER model in OKMindmap style on students' learning method.

3. Methodology

This trial research has dured for 3 months with 140 students of 10 grade on Teacher Practice High School of Can Tho University, Việt Nam, by the principal author in the role of ICT subject teacher. The learning environment are in 2 places, 2 hour per week learning in computer room and the class also happens in Facebook group https://www.facebook.com/groups/tinhoc10thspdhct for student to learn anytime, anywhere.

The procedure of our trial experiment was in the step by step procudure as following:

-Students was trained how to use OKMindmap to build their Big Book. The Big Book is filled by their interests, their personal information and all knowledge they learnt by reviewing lessons of all lectures after classes. Almost students are very exicited in this work because the first time they can draw online mindmap and all their works can be saved online.

-Students were trained to learn Scratch during learning by doing 2 hours. They can easily create the simple stories with full of enthusiasm.

-Students had 2 weeks to practice using Scratch for deeper understanding how to programming with Scratch and especially practicing computational thinking.

-Teacher gave the assignment by sending the WebQuest in one OKMindmap page like this link http://bit.ly/2atwcoY as in figure 4 to Facebook group. The duration of this assignment is 4 weeks. During this time, teacher can answer any question from students by using Facebook group conversation.

Figure 3: A new OER model designed by OKMindmap at http://bit.ly/2sfmO3L

The results of our experiment are WebQuest with Big Book in OKMindmap style and Scratch Studio by collecting student's learning products. The trial WebQuest as in figure 4 is to research about Mekong River. It designed to ask students learning about this river's story, about the climate change problem happening very seriously in Mekong Delta and the reason which caused many big problems for this river.

Fig. 4. Mekong River WebQuest designed by OKMindmap at

The Big Book in OKMindmap style which students use for self-study by putting their knowledge as figure 5 at http://bit.ly/2fBQLWl. Students can use it for review lesson for exam and for sharing with friend through Facebook or somewhere that can make the knowledge they knew become more valuable and then they can get the chance for reflecting their works and make the knowledge to be wisdom.

Fig. 5. Mekong River Big Book designed OKMindmap

We collected Scratch projects that students created into the studio https://scratch.mit.edu/studios/1640720/ as figure 5 and share it public. There are also projects made by teacher and some featured projects for references. We try to share it with the world to make our projects to be known and remixed to be better and better from the original idea. This is one of the greatest characteristic of Scratch that made us follow and try to use Scratch in our research.

Every student possessed one studio of their Scratch account. This is very important for their learning because they can share their works with others people in Scratch community. The original idea may become better work if it can be remixed. In Scratch environment, Scratchers can share their idea with each other and together comment about their work to improve the project the best

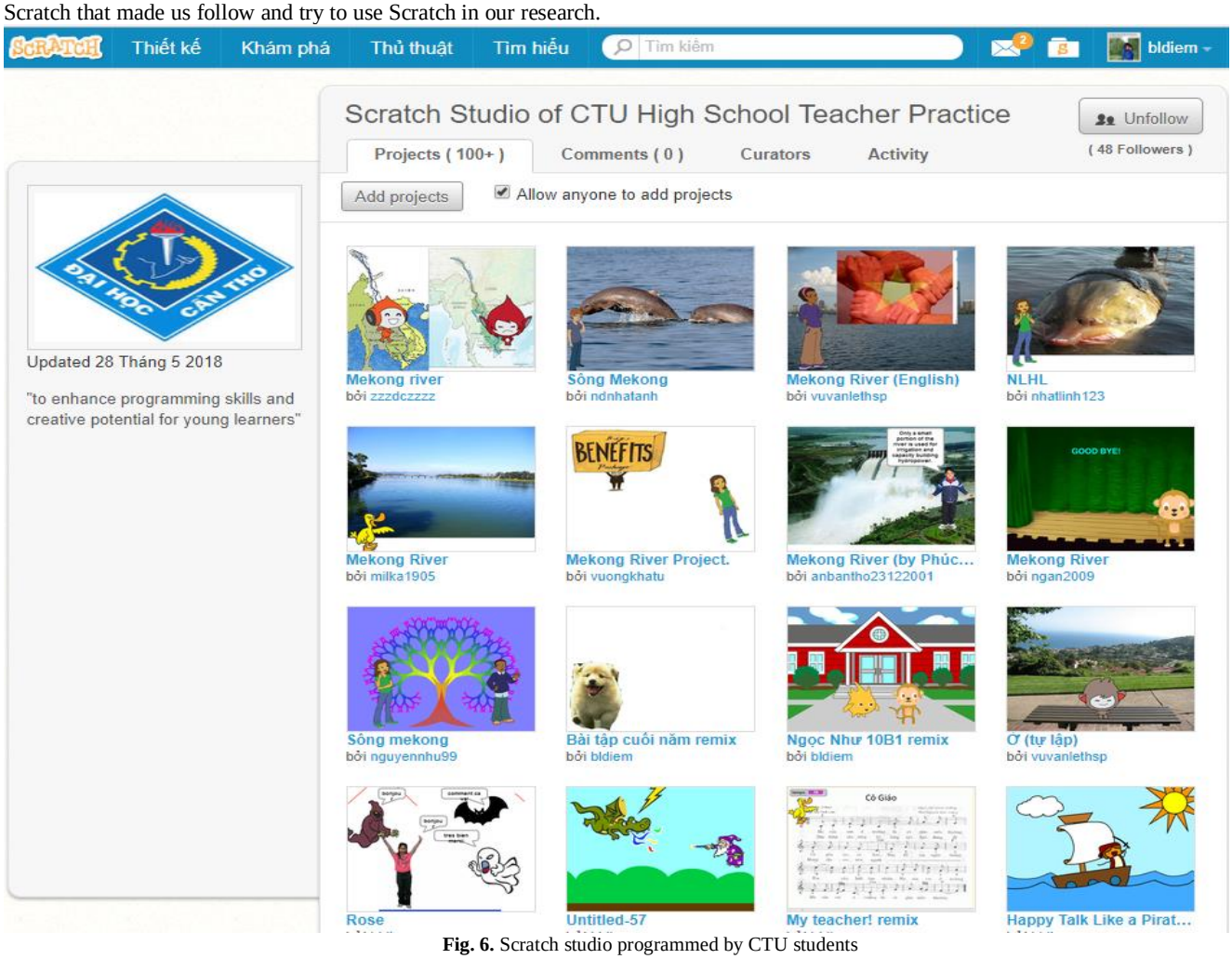

Fig. 6. Scratch studio programmed by CTU students

4. Findings

After three months of experiment, two months to repair for online tools like OKMindmap and Scratch and in one month working for WebQuest, we got the results:

Positive results:

- 100% students can use OKMindmap for learning and make their own Big Book.
- 100% students can use Scratch to create stories and interactive games.
- Some students like to create Big Book with OKMindmap. They also decide to make the Big Book for their life when they understand the benefit of Big Book.
- Some students like Scratch very much. They built their own studio and created interesting project and posted on their Facebook for sharing with their friend.

Negative results:

Some students without base knowledge of ICT met some difficulties with using computer at the beginning. They cannot follow well with the class.

Some students are lazy to follow the lecture. They like game, chat, and surfing www rather than concerntrate on doing the task actively.

We can conclude that our suggested OER model in OKMindmap style is the great tool for innovative learning teaching in developing country like Viet Nam because it is free, easy and sharable.

By using online tools as OKMindmap, Scratch, Facebook, Youtube video for flipped class, we can create open educational resources that is easy to share with each other. It is good learning environment. This research target to mobile learning when the innovation of BYOD happening in the 21st century classroom [14].

The survey results showed that most students highly appreciated the use of OKMindmap. Their opinions centred on three main issues: Practicality of OKMindmap, Increasing motivation and creativity and Enhancing the study outcomes.

4.1. Practicality of OKMindmap

The majority of students considered that the application of OKMindmap carried highly practical applicability. They believed that OKMindmap is a useful tool not only for learning but also enhancing knowledge through its capacity of creating of “a house of knowledge”, “a private book”, or “a treasure of knowledge” or “an extremely diverse world”. Thanks to this tool, students can easily “seek knowledge and write down what they like”. A representative comment is as follows:

"*I see that the OKMindmap application is really interesting and useful. It helps me synthesize knowledge that I had leant. Furthermore, it works as an on-line mind mapping tool in general – an effective way of learning being applied widely in developed countries. OKMindmap not only enables me to consolidate systematic knowledge about my study, but it also helps me build an extremely diverse world for myself. It is a house of knowledge, a house of music and especially it is free to use.*"

In addition to using OKMindmap to "create a treasure of knowledge" as a comment from a student, they also regarded it as a chance to share and exchange knowledge as well as other interesting things in life.

"OKMindmap has been and will be an extremely useful tool that helps me build a house of knowledge for myself. It also helps me share useful things in my life. I can also share and learn new knowledge. In general, it is different from the old and backward programs like Pascal, which does not fit with the modern world. The application of OKMindmap in learning can receive many supports including mine".

Related to this issue, another interesting opinion is that besides equipping knowledge for themselves, the 'Big Book' also "helps to keep record of current knowledge to meet the communication requirements of the surrounding world". The students also considered the use of OKMindmap "helps [them] save what [they] have learnt and discovered; help [them] possess a private and useful book."

Finally, in relation to this practical issue, three students thought that the use of OKMindmap to mind map and share knowledge, helping them save time and consult different sources of knowledge thanks to sharing and exchanging. A representative comment is:

"*It helps me save time in looking for information and reading books or other applications, especially in studying, it is a trusted application. It helps me have more chances to consult and gain much useful knowledge as well*."

4.2. Increasing motivation and creativity

In addition to the practicality of OKMindmap in collecting, sharing and recording knowledge, many students commented that the use of OKMindmap enhances learning motivation indirectly. They considered that mind maping useful knowledge of many different subject aspects on a 'Big Book' motivated them to learn. One typical opinion is:

"Studying with OKMindmap is very useful because I can save many useful documents or other useful and interesting things. I can update my book easily without being afraid of losing them over time. This interests me and I do not get bored with lessons from the printed books as before."

Moreover, creating a 'Big Book' by using OKMindmap has promoted students' learning, especially helping them bring into play their creativity. This helps form one of the four skills – creativity – that we mentioned above.

"Help me to be more creative"
"Support me more in creativity"
"Help my creativity fly away"

4.3. Enhancing learning outcomes

The use of OKMindmap in learning is considered to help students enhance their learning results in many different school subjects. Many students said that this was due to a transition from a traditional method to a creative and interactive method. Helping students have the ability to discover diverse knowledge on the Internet and save them systematically is a good way to help students "learn better based on collected information". Many students said that this method enhanced their engagement in their learning of school subjects, especially in Informatics.

"OKMindmap helps me save many useful and interesting things, engage me in learning Informatics which focus mainly on practices and I do not need to learn lots of boring theories".

"I think that in the age of modern science, using OKMindmap is very helpful and assist me in learning Informatics and approaching modern world."

In addition to helping students learn Informatics better, using OKMindmap also helps them learn other school subjects such as English better. Specifically, students thought that searching and reading information on the internet help them "enhance their vocabulary and grammar in English". In short, the idea of creating Big Book can motivate the students in their learning and help them find better learning methods.

5. Conclusion

In this paper, we focused on research in using online tools for the 21st century classroom [15], in STEM school [16, 17]. OER created by the online tools can lead to an innovative teaching and learning. OKMindmap is a great tool for knowledge management. It's free, easy to access, and a good service for education. WebQuest in style of OKMindmap is a good instructional strategies because it's easy to learn how to use and because it is a cloud computing service, users need only a computer or smartphone connect to the Internet to use it. Mobile learning is very suitable with the suggestion of using OKMindmap in classroom. We found that Scratch programming language is good for WebQuest learning products as project-based learning proved a good teaching method. We found that a Big Book in OKMindmap style also can be a good OER. Students' Big Book of classes in a school is the great resources. Along with YouTube and Facebook, Big Book and WebQuest in OKMindmap style as suggested in this paper can make a MOOC [18] for education transformation in developing country like Viet Nam.

This research may need more data analysis to consider about its feasibility. We continue to find out the way to apply data mining technique into OKMindmap data, with algorithms to get insights about learning and teaching activities from Big Book of students and WebQuest of teachers. We can then suggest suitable mindmaping method by applying thinking skills to make the best cognitive map. From a well-built mindmap, we can apply data analysis techniques to mine knowledge about it's author and then support educational institutions for making decision for better and better educational services.

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