VISUAL TOOLS FOR CONCEPT MAP

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Abstract- This paper presents the visual tools available for concept map approach in designing the content. The applications on visual tools will be based on the interface of the tools for newbie. Some of the visual tools are useful for ideation. It is useful to be explored by newbie students. Therefore, for this study will look into the visual parameter that suitable for this learning context of the students. The matrix of the software will be speared towards the usage of these visual tools. At the end of this paper, the visual tools matrix will be tabled towards the need of the ideation from the students' perspective. A further study will be generated to find the visual tools most suitable for design students using it as part of their facilitative tool in generating the concept for their creative works.

Indexterms- Visual tool, Concept map, Matrix, Knowledge capturing, Software elements.

I. INTRODUCTION

Visual tools have been researched towards the usage by the conceptual approach in sharing the knowledge via the visual concept rather than using the only text as the basic primary tools. Visual tool is a platform for the student to meddle in ideations through the visual approach.

Visual tool is not a skill or a strategy but the combination of content and process and transforms the information into active knowledge structure. There are three types of purposes when deciding in using visual tool for gathering the information. Firstly, the brainstorming web for fostering individual and group activity which is useful if the students need to gather different information from each individual. Secondly, use the graphic organizer for fostering basic skills and content learning where the students have the idea and put on the paper-based before they connect it as full content. Lastly for the three types of purposes when deciding the visual tool is the conceptual mapping for fostering cognitive development and critical thinking.

Based on this assumptions the visual tool will be reviewed for the best approach when deciding the best visual tool to support the knowledge capturing process. The students' perception on using the visual tool as part of their learning engagement will be the varied based on their capability of using the computer. Therefore, this study will look into the observation of one student as the beginning of the journey from non-visual to visual which combined the paper-based visual tool and online visual tool in knowledge capturing phase. This will be on the idea of given a scenario on finding the information and fostering the knowledge structure using concept map.

II. CONCEPT MAP FOR VISUALIZATION

Concept maps are one way to make classroom content easier for students to understand. The visual tools as educational tools are a great way to simplify information by allowing students to visualize complex processes. They also engage student's creativity and higher order thinking skills.Concept maps allow students and teachers to simplify complex information by showing relationships using lines and boxes [1].
Regardless of the type of information being presented, all concept maps have a central idea. Depending on the relationship type, a concept map can illustrate a sequence of events, a cycle, or steps in a process [1]. They are visually appealing and convey information quickly.

For this study the diagrammatic technique of knowledge that will be is Concept Mapping. Concept map provide a graphical idea can be on paper-based or can find few software for the digital visual tools, one only have to understand the concept of mapping the information they gather and use the visual tool to construct concept maps.

These knowledge maps help you organize information in such a way that you gain greater insight into the knowledge and therefore be able to take the necessary action steps to turn the information into useful concepts for educational purpose.
Purposes of concept mapping are[1]:

- To generate ideas (brainstorming etc.)
- To communicate complex ideas
- To aid learning by explicitly integrating new and old knowledge
- To assess understanding or diagnose misunderstanding.

The visualization tool has the key requirements to their conceptual model to discover the understanding to overcome the design problems with different visual abstractions, interactions, and layouts. Furthermore, it is very important for students to visualize the information they have gathering and to understand the information better as shown in Figure 1 [2].

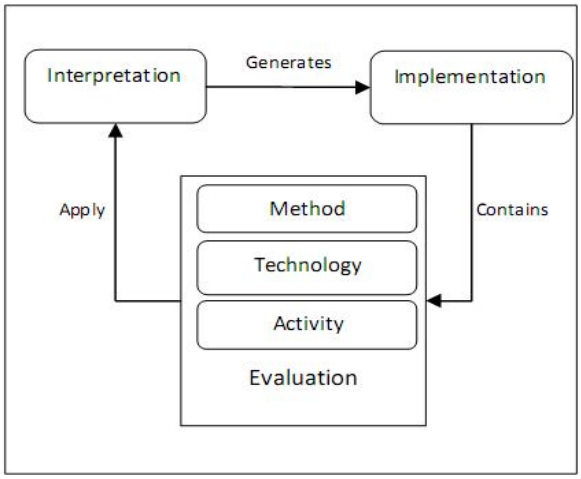


Figure 1: Conceptual Model for Knowledge Sharing Model[1]

Figure 1 shows the conceptual model for knowledge sharing that will be used as visualization tool for students to develop their capturing, analyzing and organizing knowledge as partial their daily routine in knowledge structure [2]. Thus, this conceptual model is useful for the early stage of building the knowledge structure.

Meanwhile, referring to Donald A. Schön's theory of reflective practice, Gänshirt proposes the concept of the design cycle as a recurrent time pattern to describe the reflective and repetitive structure of design processes [3]. At this stage, the expressing of visual as for communication, sharing the information also can build the idea and can lead to the critical thinking.

More researchers have look into the new cycle with the critical thinking of the perceived idea. Based on the Ganshirt explanation, the design cycles as circular time structures which may start with the thinking of an idea, then expressing it by the use of visual and/or verbal means of communication (design tools), the sharing and perceiving of the expressed idea, and starting a new cycle with the critical rethinking of the perceived idea [4]

"Visual tools that produce images make it possible to express inner ideas in a visual form, so that these can be looked at critically and conveyed to others, while the verbal design tools that produce texts are there to describe, analyze and criticize design ideas. Or put briefly: the visual tools are used primarily for devising form, and the verbal tools for developing the meaning of a design."

—Gänshirt, Tools for Ideas, [3]

III. VISUAL TOOLS FOR CONCEPT MAP

In this study, the visual tools which are being selected are more on the usage of concept map approach for constructing the knowledge. Therefore, most of the visual tools are online as the platform for the students. Thus even though there are a lot of visual tools available but in this paper will look into the web-based diagramming software. Table 1 below shows the visual tools as for the conceptual mapping in this study.

Table 1: Visual Tools Example for Concept Map

Visual Tools	Web site Online	Types
Coggle	http://www.coggle.it	Cross-platform
Lucidchart	http://www.lucidchart.com	Web-based
Creately	http://www.creately.com	Real-time

The software uses currently are online and have a trial package free at the moment. Based on the study the software should be more comfortable with the usage as the students' capacity.

IV. CONCEPTUAL CONTENT IN CONCEPT MAP

At the beginning, in this study Coggle has been choose based on the mirroring of paper-based concept map much more faster and easier to manipulate it. Coggle is an easy-to-use concept mapping tool developed by recent Cambridge graduates James Crosby and Andy Pritchard. The site has been available since March in"Beta," which means the developers don't promise it will always work. On the up side, they do promise to keep Coggle free forever [5]. After logging in with a Google account, Coggle provides a canvas where you can build a two-sided tree. Start with a central idea in the middle and then add branches on the left or right. It's easy to drag branches around and rearrange them. The nodes are text by default, but you can incorporate other information:

- Images and links
- Formatted text with markdown
- Symbols and equations using Mathjax [5]

One of the best features is real-time collaboration. You can share a Coggle with predefined group, with specific email addresses, or by sharing a private link. You can also share offline by exporting your Coggle to a PDF or PNG file.

Coggle is a cross-platform tool based on HTML5, and it works reasonably well on an iPad. It also saves versions, so you can go back to an earlier stage if you mess up. You can also copy someone else's Coggle as a starting point for your own.

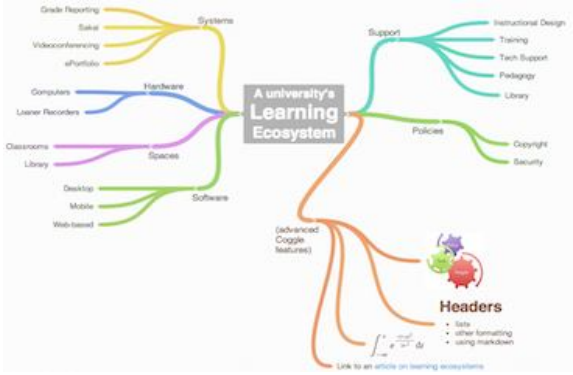


Figure 2: Coggle Sample of Learning Ecosystem.

Figure 2 shows the example of student doing it based on the Learning Ecosystem. It still uses the same process as paper-based but the colour shows different concept of mapping the idea of Ecosystem.
Meanwhile, Lucidchart is a web-based diagramming software which allows users to collaborate and work together in real time to create flowcharts, organizational charts, and mind maps. Use Lucidchart in the classroom to create flowcharts, mind maps, graphic organizers and other diagrams. Enable students to easily collaborate on group projects[6].

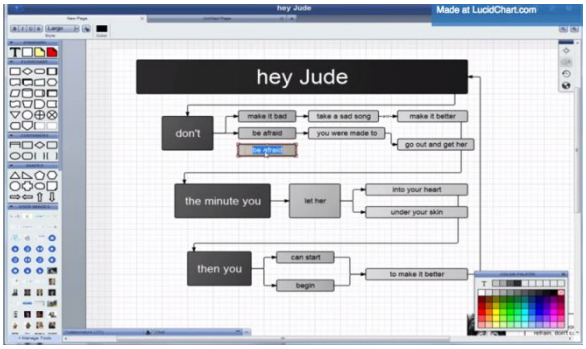


Figure 3: Lucidchart Sample

Figure 3 shows example of using Lucid Chart as hierarchy data or putting the information into the tree map concept. Thus, it reflect more on the suitable graphical at the left side to be included. Therefore, it will be more on the information flow from top to bottom vice versa which is more accurate on the organization of information.
The last of the visual tool is Creately which claims that it is useful for the real-time activities. [7]. Creately is a real time diagram and flowchart collaboration web tool.It provides over types of diagrams with specialized features to help you draw faster and better [7].

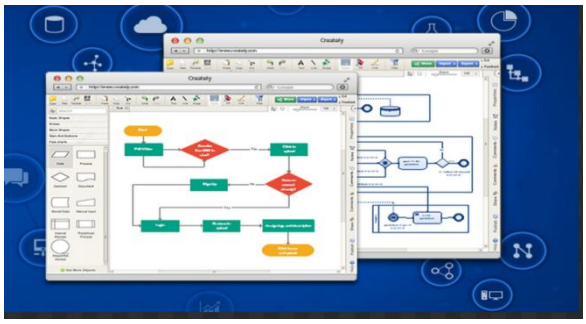


Figure 4: Creatly Sample on using flowchart and sharing with others at the real-time.

Figure 4 shows the example of using the flowchart and at the same time can share with another user for the interactive of designing the flowchart.

V. SCENARIO BASED ON CONCEPT MAP

This study use the constructivist learning theory where it use the concept map as the basic for understanding before developing the skills. This teaching-learning strategy is grounded in constructivist theory, which states that we create meaning from the interaction between our experiences and our ideas.

At the first stage the assignment given is to find the authentication and verification technology used in daily life. Using the paper-based, the participant draws the paper-based hierarchy top-down approach for the information that the participant has gathered it. To make it easy for the participant to go through at the first phase, he has beenintroduce the paper-based concept map.

At the beginning the requirement is to find the technology available which is used in the industry in Malaysia. From this information, the participant has to come up with the concept map that is more geared towards the approach of the title. Then it put on the paper-based concept map before turning into the software.

The information given basically is to show how the participant understands on the topic and find it the information on Internet before discuss with other participants.

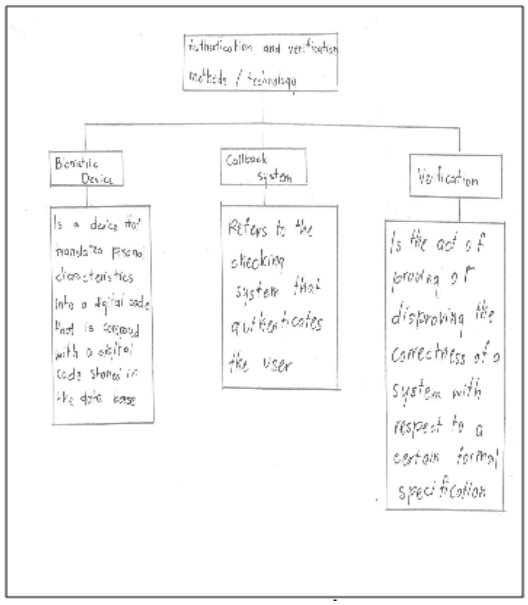


Figure 5: Paper-based Concept Map

Figure 5 shows the example of the paper-based concept map where the student has been given the choice of draw the concept map on the paper at the beginning stage.

Later on the participant has chosen the diagrammatic tools as part of the transformation paper-based to digital-based concept map. The participant has chosen the Coggle software at the beginning stage in transforming his idea using the canvas concept as shows in the figure below.

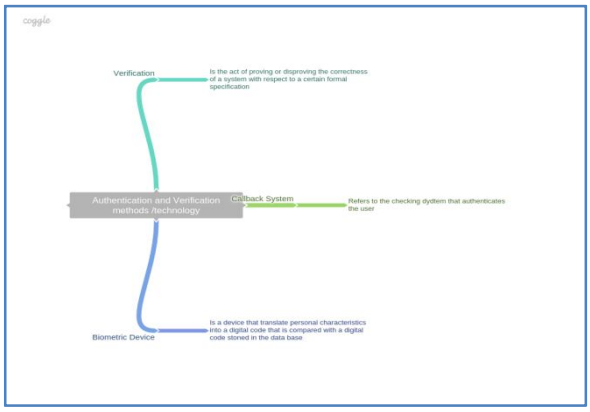


Figure 6: Transforming into knowledge structure for first scenario.

Figure 6: Transfer the paper-based into digital based concept map which include the knowledge structure of the hierarchy structure.

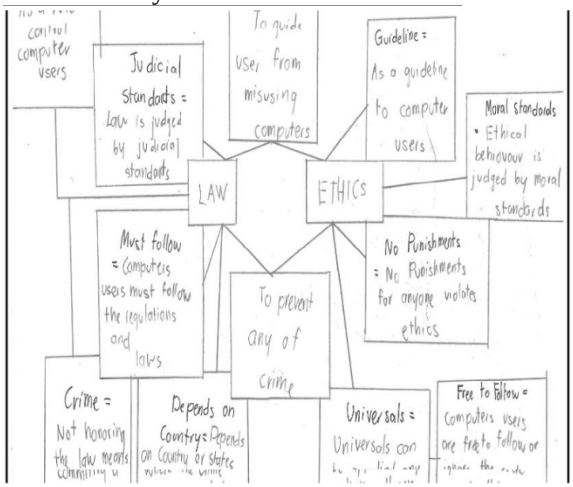


Figure 7: Paper-based Concept Map on Difference Meanings

Meanwhile for the second scenario is the difference between ethic and law in ICT environment. Figure 7 above shows an example of the Paper-based Concept Map on 'Different between Ethic and Law'.

Using the same approach, the participant transfer it suing the visual tool namely Coggle to transfer it into the knowledge structure. Below this figure 8 shows the second scenario using Coggle which is easy to transfer the information using left and right mapping as to differentiate the ethic and law.

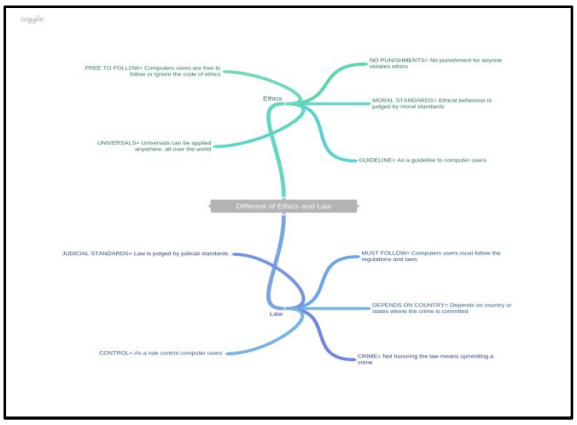


Figure 8: Transforming into knowledge structure

CONCLUSION

Concept maps are great tools for any classroom regardless of grade level. By utilizing concept maps both students and teachers benefit from their ease of preparation and comprehension. At this point either paper-based or digital-based concept map, it is useful in gathering the idea of using it. Meanwhile for the digital concept map is useful for sharing the idea with other. The engagement of using the visual tool always is the easiness and method to use it. Graphic organizer tools always have impact on the newbie students. This technique is very useful when it comes to fostering to nature of using concept map. This type of teaching tool can be used for various learning or teaching styles, and is a great way to improve the presentation of any subject matter.

Information is traditionally presented in printed text, with only words to describe the relationship between two or more things. This type of presentation can be monotonous and daunting to some learners. Concept maps help students visualize connections that may not appear when reading. Aside from simplifying printed information, they make learning more interesting, and enjoyable.

There are several benefits to concept maps. When they are developed properly, they can address multiple learning styles. They allow teachers to present information in a novel format that facilitates knowledge and thinking, and function as a learning tool for student centered activities. Another benefit is the positive influence concept maps have on retention of new knowledge; this benefit may accommodate the visual learner most of all, but most people appreciate the clarity of seeing relationships between two ideas.

Therefore for further research, this study will look into the visual tool as collaborative teaching and learning tool for students in the real-time application. It is hope that this study will open a new leaf for the ICT subject as part of the requirement in the exam orientation.

ACKNOWLEDGE

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[5] Coggle http://coggle.itCopyright © 2015 CoggleIt Limited.

[6] Lucid Chart, http://www.lucidchart.comCopyright © 2015 Lucid Software Inc.

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