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Collaborative Mind-mapping Using Cloud-based for Lifelong Learning

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Abstract

Lifelong learning allows continuous learning of adult learners in pursuit of enhancements in terms of personal development, social inclusion, competitiveness as well as employability. Previous research has indicated that lifelong learning is usually conducted using individual perceptions such as the use of surveys or small-group focus groups. Yet, collaborative approaches that involve larger number of participants are limited. Moreover, in such approaches, there is also a lack of a common space in which participants can view and share their ideas with other participants. As such, in solving these issues and filling the gaps, we applied collaborative cloud-based mind- mapping in analyzing lifelong learning environments for higher education. The study involves 184 lifelong learners from North, Central and East Malaysia pursuing their postgraduate studies in the field of education. The software used for cloud-based mind-mapping was Coggle that enable real-time collaboration among the lifelong learners. In analyzing strengths, weaknesses, opportunities, and threats in lifelong learning environments, we conducted a SWOT analysis that was based on four aspects: learner management, pedagogical approaches, support system, and best practices. Findings indicated that the collaborative cloud-based mind-mapping could be potentially used in eliciting issues, benefits, limitations, and future improvements of lifelong learning environments.

Keywords: Lifelong Learning, Cloud-Based Mind-Mapping, Online Mind-Mapping, Higher Education, SWOT Analysis

Introduction

According to constructivist approach, learning is the process of individual linking up between his/her information. Individual uses the information recorded to his/her brain while forming the links. Human brain consists of two basic parts as the right and left lobe. Activities conducted by each lobe are different. Left lobe is responsible from logic, words, arithmetic, linearity, lines, lists and analyses; left lobe takes on the tasks such as spatial awareness,

imagination, emotion, colour, rhythm, shapes, geometry and synthesis (Buzan, 2005). According to Townsend (1998, p. 94), it is required both lobes to be utilized in coordination in order to ensure learning properly. Learning actualise with the whole brain and brain prefers collaboration to conflict (Healy, 1997, p.45). Hence, both lobes of the brain are effective in learning. As well as two lobes of human brain have different tasks, these two lobes do not perform separately. Because they must cooperate in order to display efficient performance.

The more two sides of the brain operate at the same time, the more brain considers very well, stores lots of things and recalls faster. Mind maps were developed as a technique which was designed likewise the operation of the brain by using its right and left lobes together and which enables the ideas being reflected on paper. Thus, in solving these issues and filling the gaps, our research objective is as follow:

- to investigate collaborative mind-mapping for lifelong learning analysis in higher education by using cloud-based,
- to explore how the approach can be used in identifying strengths, weaknesses, opportunities, and threats of lifelong learning environments.

Literature Review

Lifelong learning allows continuous learning of adult learners in pursuit of enhancements in terms of personal development, social inclusion, competitiveness as well as employability. With regards to lifelong learning in the education field, this refers to teachers, principals, administrative staff and government officers. Previous research has indicated that lifelong learning is without its implementation issues, and approaches for eliciting the issues are usually conducted with individual perceptions such as the use of surveys or small-group focus groups. Yet, collaborative approaches that involve larger number of participants are limited (Lin, Chang, Hou, & Wu, 2016; Norman et al., 2017). Previous studies have reported that collaborative mind-mapping can be used to promote scientific knowledge discourse by co-creation of knowledge in research teams and mutual negotiation of relationships on mind-maps.

Previous research has also discovered that having a collaborative visualization of ideas can facilitate co-construction of knowledge and discussion in these types of visualizations are richer and facilitate a higher level of collaboration among participants (Lin et al., 2016; Liu, Zhao, Ma, & Bo, 2014). Another issue with regards to cloud-based collaborative mind-mapping is most of the tools are unable to provide real-time collaborative mind-mapping. Here, the lack of real-time collaboration could cause teams to face problems in providing a common understanding in one another ideas in mind-maps (Lin et al., 2016; Norman et al., 2017, Wu, Hwang, Kuo, & Huang, 2013). Furthermore, there are limited studies that study SWOT analysis of lifelong learning environments via cloud-based collaborative mind-mapping (Bull et. al, 2016; Li, Yao, & Chen, 2014; Romero-Gutierrez, Jimenez-Liso, & Martinez-Chico, 2016).

Methodology

Participants

The study was conducted with 184 participants who were Masters students studying about academic writing in distance learning environment settings in Universiti Kebangsaan Malaysia (UKM) at learning centers in North, Central and East Malaysia. The participants were all life-long learners who were working in the field of education that consisted of primary and

secondary school teachers, government and non-government officers who worked in the field of education.

Data Collection and Analysis Methods

The data collection involved a qualitative approach using a cloud-based collaborative mind-mapping using the Coggle software. The software allows for producing mind-maps with multiple users in real-time. A previous study by Norman et al. (2017) discovered that online collaborative mind-mapping could be potentially used for eliciting issues from current problems of a community. They applied the approach for studying the Bottom 40 (B40) community with a panel of multi-disciplinary experts.

The cloud-based mind-mapping approach for carrying out a SWOT (strengths, weakness, opportunity, threat) analysis of current life-long learning environments. The study was conducted based on the comparative education analyses by Bray (2005) where the study focused on four aspects, which were: pedagogical approaches, learner management, support system and best practices that was conducted as follows. These aspects were mapped into mind-maps and respondents were asked to elicit any strengths, weakness, opportunity, or threats perceived based on the four aspects. This was done in real-time at the end of the semester with all the respondents in all three learning center locations (North, Central, and East Malaysia).

The data analysis was conducted based the ADDIE (analysis, design, development, implementation, and evaluation) model as follows (Norman et al., 2017). First, in the analysis phase, the issues that were transcribed from the collaborative mind-maps in all three regions. A SWOT analysis of the four aspects (learner management, support system and best practices) were included analysed via the inductive thematic analysis carried out in five phases (Braun & Clarke, 2006): (i) familiarizing with the data; (ii) generating initial codes; (iii) searching for themes; (iv) reviewing themes; and (v) defining and naming themes. Second, in the design and development phase, the themes were revised and themes were further refined. Finally, in the implementation and evaluation phase, the entire process was re-conducted until the themes achieved saturation.

Results

The cloud-based mind-mapping produced three mind-maps with 12 branches and 65 sub-branches, as illustrated in Figure 1, 2, 3 and 4.

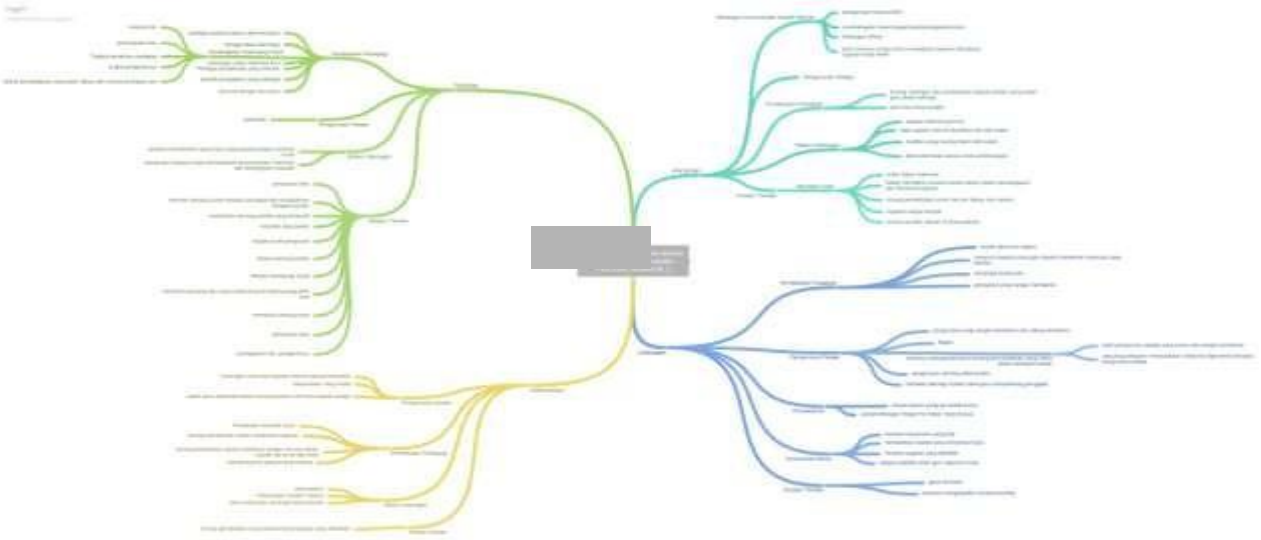

Figure 1. *The cloud-based collaborative mind-map from the north region*

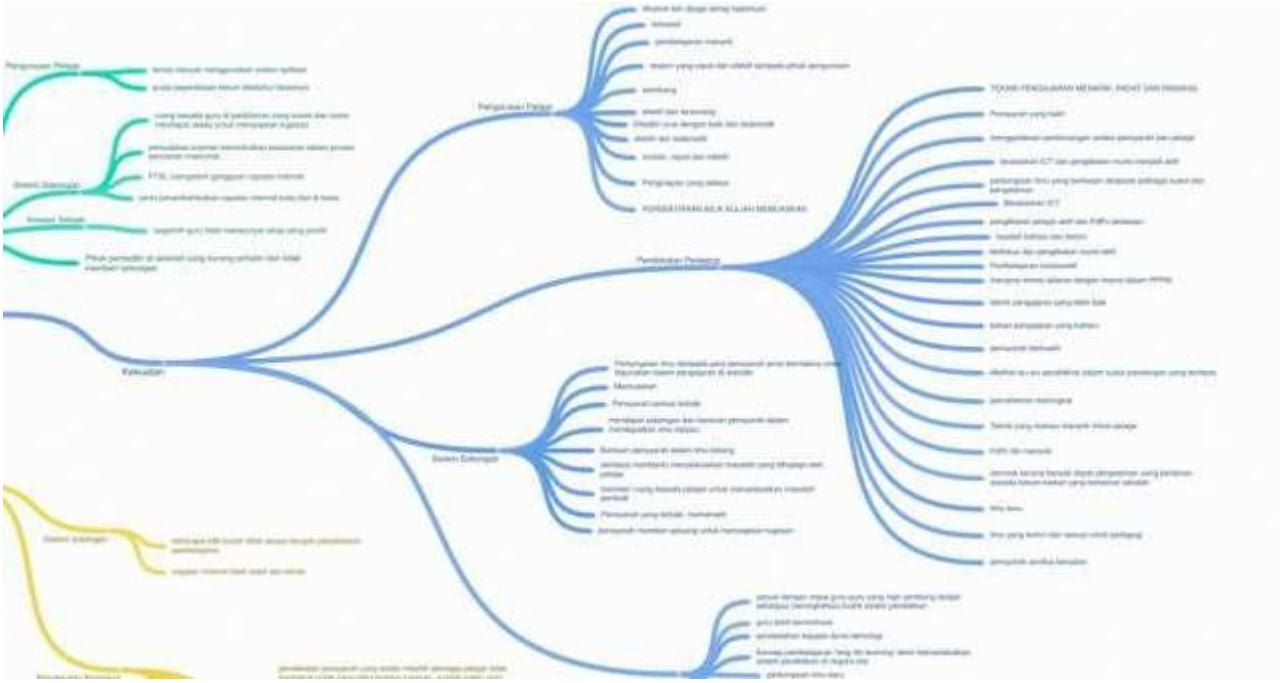

Figure 2. An example of a cloud-based collaborative mind-map from the central region (zoomed-in)

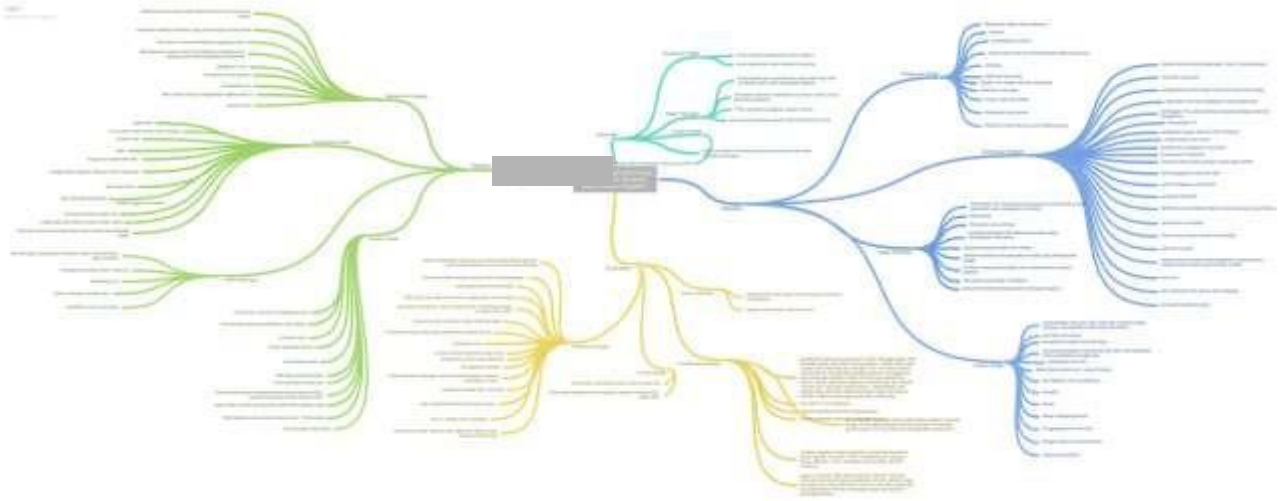

Figure 3. The cloud-based collaborative mind-map from the central region

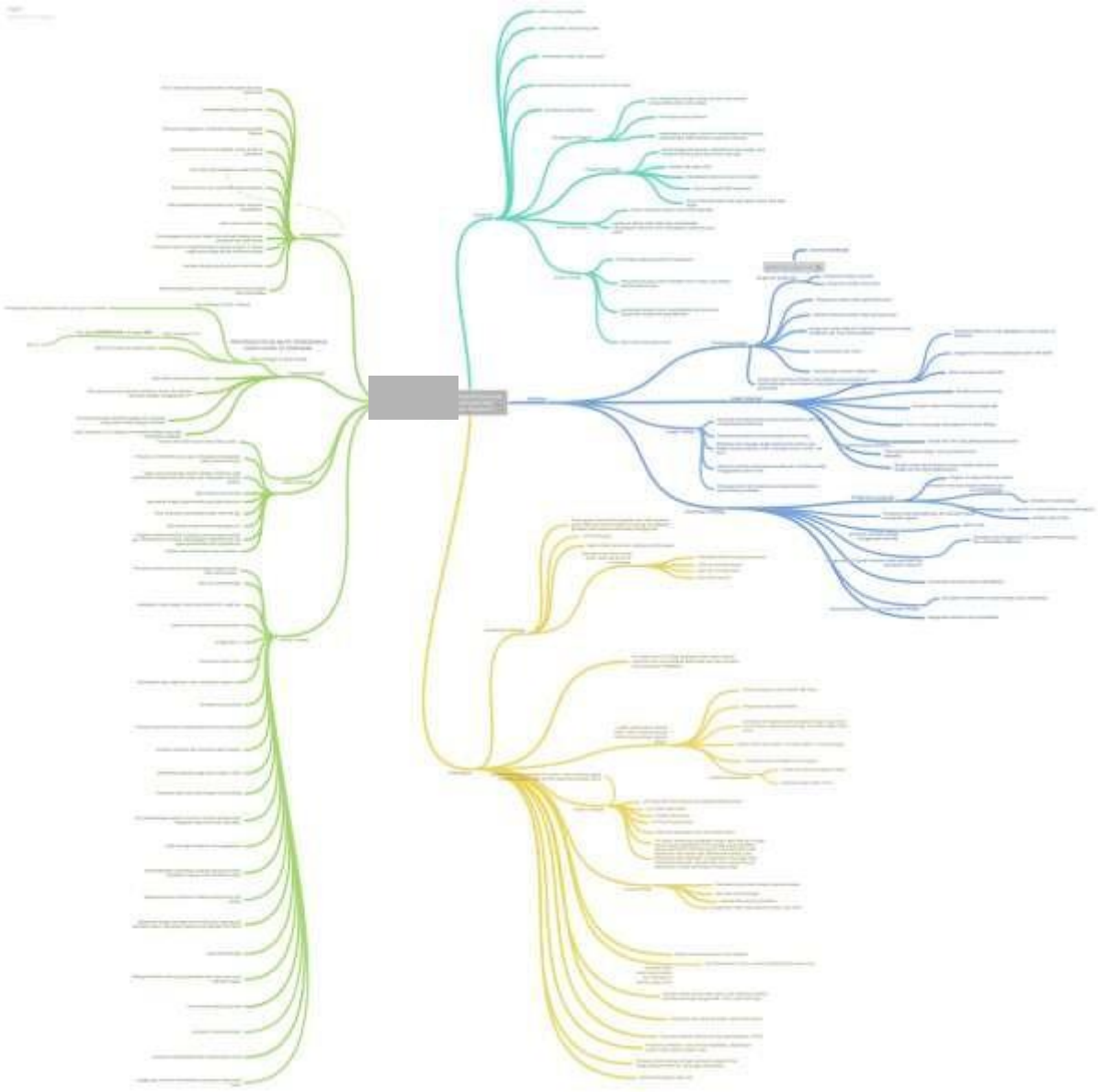

Figure 4. The cloud-based collaborative mind-map from the east region

Discussion and Implications

From the findings of the study, some implications can be drawn, which are cloud-based collaborative mind- mapping could be used as:

A cloud-based tool to elicit issues of lifelong learning environments

In the study, mind-mapping was used to conduct a SWOT analysis regarding lifelong learning environments in three different regions collaboratively. This assisted in identifying strengths, weaknesses, opportunities, and threats with regards to a micro perspective of learning environments in a particular region as well a macro perspective – looking to these learning environments from a holistic perspective.

As a mutual platform to collaboratively co-construct a SWOT analysis

Cloud-based collaborative mind-mapping also allows for co-creation of knowledge. Norman et al. (2017) discovered that online collaborative mind-mapping using Coggle could be used as an iterative process of eliciting issue of marginalized communities. Moreover, this type of mind-mapping allows participants to mutually agree or disagree on a SWOT analysis. In relation, Lin et al. (2016) revealed that concept mapping with Google Chat and Docs allowed participants to collaboratively visual each other ideas allowing for negotiation and development of relationship in mind-maps.

A large-scale qualitative approach in SWOT analysis

In comparison to large-scale interviews and focus groups, cloud-based mind-mapping could be used as an efficient qualitative approach in terms of respondent inclusion, in other words, the approach empowers respondents to provide their views that also includes respondents who do not or are unable to voice their opinions verbally. Moreover, as respondents view comments of their peers or other participants in a common visualization, this could help them identify their mutual perspectives towards an issue and identify gaps that could be missed out or not included by others.

A real-time cloud-based collaboration tool

The software used allowed collaborative mind-mapping to be carried out in both synchronous and asynchronous manner, which allowed for real-time collaboration and interaction Lin et al. (2016). Furthermore, the tool allowed for tracking of the mind-mapping process in which it allowed maps to be re-visited to an earlier version (Norman et al., 2017).

Conclusion

The paper discussed the investigation of cloud-based collaborative mind-mapping as an approach to conduct a SWOT analysis of lifelong learning environments in terms of learner management, pedagogical approaches, support system, and best practices. The findings indicated that the mind-mapping approach could be potentially used in eliciting issues, benefits, limitations, and future improvements of lifelong learning environments. Some future directions are suggested as follows. First, with regards to lifelong learning environments, the study focused on postgraduates who were working in the education field. It would be interesting to investigate on postgraduates who are working in other fields such as science-based fields. It would also be beneficial to look into undergraduates or other types of lifelong learners and whether these types of learners would affect the SWOT analysis of lifelong learning environments. Second, as for lifelong environments, it would be interesting to investigate whether different learning environments such as massive open online courses (Badusah, Norman, Mohammad, Nordin, & Kamrozzaman, 2016) or mobile learning environments (Ally, Balaji, Abdelbaki, & Cheng, 2017; Nordin, Embi, Norman, & Panah, 2017) would have an effect of the findings. Third, with regards to co-creation of aspects of a SWOT analysis, quantitative approaches such as social network analysis (Luke, Lloyd, Boyd, & Den Exter, 2014; Nordin, 2017) could be used in triangulation of qualitative measures. Finally, in terms of cloud-based mind- mapping, it would be interesting to investigate whether other thematic approaches could be appropriate for SWOT analysis of lifelong learning environments and see to what extend other approaches could be used in line with cloud-

based collaborative mind-mapping. In sum, it is hope that the paper would be beneficial to future researchers and educators interested in cloud-based collaborative mind-mapping.

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