Concept Bubbles for Helping Students in Concept Oriented Courses

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1. Introduction

Cognitive skills are the mental capabilities students need to successfully learn academic subjects. They are the individual mental skills that everyone uses to learn. There are several terms that all mean essentially the same thing: cognitive skills, mental skills or tools, underlying skills, learning tools or skills, processing skills, and intelligence. Since the brain is such a sophisticated organ, learning is a complex process. Many interrelated cognitive skills contribute to academic and occupational success. Broadly categorized, these critical skills include:
- Attention
- Working Memory
- Processing Speed
- Long-Term Memory
- Visual Processing
- Auditory Processing
- Logic and Reasoning

These skills are interdependent. Often they overlap in their work with other skills, as all the bits of information entering the mind are processed and acted upon. The strength or weakness of one skill impacts the general effectiveness of other skills. Each skill makes a contribution and needs to function well for overall learning to be easy, fast, and successful.[1][2]

Students often complain about lot of information that has to be remembered in Concept Oriented Courses (Course which have a lot of information or concepts to be remembered). One of the best ways to help students to do well in such courses is to pass the hint on how their teachers understand the concepts. The teachers also have some strategies to memorise the concepts themselves. If the teacher showcases the strategy they use or help them build a schema that could be used by them to memorise, it can help them to enhance their capabilities to deal efficiently with these concepts.

There are many studies that discuss about such pedagogical methods. Based on such studies[][] and feedbacks from peer reviewers a pedagogical method has been developed and used in teaching a concept oriented course. The method is named as Concept Bubble, which focuses on the visual processing component of Cognitive skills

The paper showcases the procedure for developing Concept bubble for a course and their findings. The rest of the paper is arranged in the following manner: Section II discusses about the course and the learning outcomes of the course which were tested using Concept Bubbles, Section III discusses about the Concept Bubbling and the technology used in developing those concept bubbles, Section IV discusses about Rough Criteria to Measure Effectiveness and Success of using Concept Bubble and finally the conclusion and future work is discussed in Section V.

2. Description of the course and Learning outcome

Concept Bubbles were used in teaching the Foundation Level course for entry level students at Qatar University. The name of the course is Computer Foundation Level 01 (CFL:01).The following sections describe about the course, which can be referred as a Concept Oriented Course with lot of concepts and information.

2.1 Computer Foundation Level 01 (CFL:01)

This course is designed to provide students with learning environments to master the fundamentals of computer skills that are considered vital in coping with technology as an educational tool in their future studies. The course contents focuses on basic computing skills, both theoretical (computer concepts) and practical (using Windows and Microsoft Word).

2.2 Learning outcome of the Course (CFL:01)

Amongst the various Learning outcomes, this teaching method is really effective in achieving the following two learning outcomes, which is assessed during the test, whose results are shown later in the paper:
1. Identify basic computer operating skills
2. Explain different computer concepts

3. Concept Bubbling and Design

Research shows that a lecture could be unproductive at times as the human brain has an attention span of 8-20 minutes. Thus after 8-20 minutes of lecture if the brain is allowed to stimulate something or given an interactive activity relating to the 8-20 minutes of lecture, it becomes really productive, after which they could refresh themselves and go for another 8-20 minutes of lecture. [15] This was the approach utilised where after each 8

minutes of lecture the students were given something to revive all the information in a summary, followed by small question answer session. The summary provided to them was known as Concept Bubble.

Concept Bubble is the process of presenting concepts in a simplified form of bubbles which could be referred to refresh and remember the concepts. These can help students to revise all their concepts at a glance and refresh their minds once they are done with the lecture notes, presentation, examples etc. As the process gives some visualization to the concepts, it becomes easier for students to relate concepts and interpret them well. The Concept Bubbles are first prepared from the lessons and then exhibited using attractive presentation software called

Prezi is an e-learning material that helps to interact with the concept bubble in a more user friendly way. The features in Prezi (Path, Shape, Zoom etc.) interests the students more and facilitates them to create a flow of understanding the concepts. Therefore, it results in an efficient way for students to memorize and understand the concepts.

Concepts from each lesson are taught to students during the class. Concept bubbles are then developed based on the lectures and exhibited in Prezi. These Concept Bubble works as a summary for the students once they have gone through the whole course material. Later, Snap shots taken from the Prezi can be posted on Learning Management System (like Blackboard) in order for students to take printouts and use them. Students are advised to refer them before exams, rather than panicking and going through the whole course material. The diagram above (Fig.1.) shows the procedure of developing these Concept Bubbles.

Lesson From Text Box

Concept Bubble

Fig.1.Description of Concept Bubble from Lesson Prezi

4. Rough Criteria to Measure Effectiveness and Success

The effectiveness of Concept Bubble could be verified by the following:
- Test Score Results
- Number of hits on the Concept Bubble content area on the LMS (Blackboard)
- Feedback from students

4.1 Test Score Results

The concept bubbles were given to the students which they used before the tests as a sort of learning material or revision. The following result is based on the test for chapter 01 whose concept bubble is shown above in Fig.1.The students had the following result (Refer: Fig.2.) where around more than 50% of the students got a score of more than 120/150 which is an extremely good score considering the fact that they are from various majors and English it not a native language for them.

Last Name	First Name	Student ID	Quiz-01(150)
Ahmad	Mahdiyeh	201105947	130
Al shaiba	Samah	200915517	80
Al Thani	Shaikha	201104039	150
Al-Hajri	Noora	201105721	130
Al-Hammd	Dana	201106500	90
AL-Humaidi	Fatima	201106479	
Al-Khuzaei	AlDana	201105809	150
Al-Kurdi	Lubna	201105631	150
Al-Mansoori	Noora	201107157	130
Al-Marri	Reem	201103944	90
AL-Musaddi	Maysa	201106592	130
Al-Subaey	Shayma	201106658	120
Al-Sulaiti	Alreem	201108031	80
Alattiya	Noora	201106480	130
AlHeidous	Fatima	201105628	60
AlMesaifri	Jawaher	201103379	110
AlSaai	Hind	201103988	150
AlSuwaidi	Hajer	201002169	50
Elghalayeeni	Ward	201105560	140
Kotb	Amina	201107352	90
Maklani	Shaikha	201107147	20
Meqdad	Nora	201106086	150
Thamer	Mona	201102416	140

Course Results
- Score More than or equal 120/150
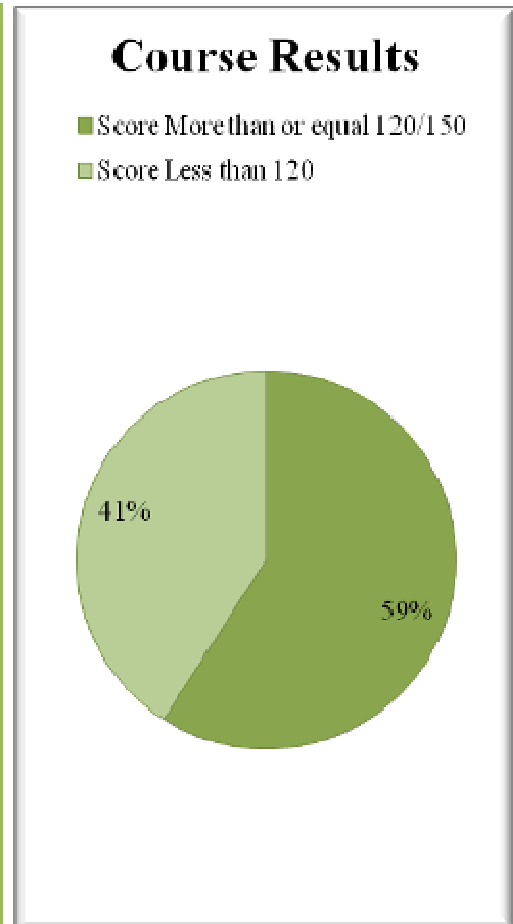- Score Less than 120

41%

59%

Table1.Test Result Table   Fig.2.Chart showing the Result

4.2 Number of hits on the Concept Bubble content area on the LMS (Blackboard)

The 12 days Tracking Report generated from Blackboard from the above designated course is shown in Fig.3. In the e-learning section there are 3 folders (Class Presentation Slides, Lesson Chapter Back Questions Answers and Interactive Puzzle) and a total of 9 course materials, 3 from each chapter (3 chapters), whereas the Concept Bubble has only 3 materials (one from each chapter). Thus the e-Learning Material has 3 times more content than the Concept bubble and students hit the e-Learning more in the class as they download the Presentation Slides. The concept bubble is based on their discretion to use. It shows that proportion wise Concept Bubbles are accessed more than E-Learning Materials.
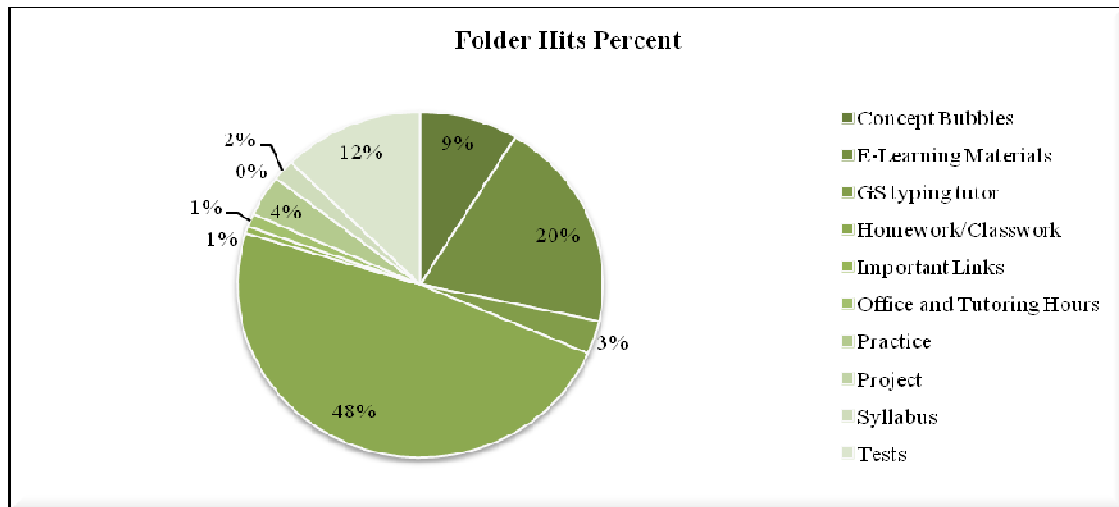
Fig.3.Hits to the Contents on Blackboard

4.3 Feedback from Students

Blog on the Learning Management System (Blackboard) was used at Qatar University to take student's honest feedback about the usefulness of the Concept Bubbles, as the blog entries were anonymous.

- *"I loved the concept bubble; it's so helpful and easy to memorize and to remember. Thank you for your help and time."*
- *"It was fun to learn and useful. Thank you."*
- *It's very helpful and useful for the student"*
- *"The concept bubbles are very useful and helpful. I also think your black board site is a very good one too. Thank you very much."*

5. Conclusion and future work

The above project was done for one semester where the concept bubble proved really useful and helped the students to understand and memorise the concepts better. Concept Bubble is really helpful if relevant concepts are related and exhibited in a simplified form. The use of Prezi software makes it easier to emphasize the flow of concepts. Feedback from students will improve the methodology and help them to resolve difficulties to memorise concepts and lessen their burden. Moreover, it will increase the efficiency of the students and allow them attain the Course learning outcomes in a more interesting manner. The work could be further expanded to other concept related courses and the effectiveness could be compared on a larger scale or for more than 2-3 chapters to see how helpful it could be. The work of this paper was to present a framework that could be used to help students in concept oriented courses.

References

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