The Outreach Activities of GEBCO for Young People with Puzzles and VR

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- GEBCO has discussed the importance of outreach activities for GEBCO including IHO (international hydrographic Organization). There was also doubt that the outreach activities of GEBCO were not effective as • far as IHO do not have any outreach group or plan for the IHO activities. But we have established outreach working group under GEBCO and have run an outreach subpage of GEBCO and filled various contents related to students and teachers. Targets of outreach activities were clearly defined and strategies were also discussed in GGC meetings. Here we would like to show a simple game for students to play GECBO world map.
- We have developed GEBCO world map puzzle. The purpose of the game is to recognize three facts. Oceans have different shape and depth like land. The second fact is ocean is larger than fragmented lands. • Finally, students will have more detailed information from the GEBCO outreach site than before the playing the game. Sliding puzzle of GEBCO world maps can be manipulated via internet whether personal computer or mobile phone, as it is called, web-app hybrid version or responsive web technique.
- The second trial is to utilize virtual reality techniques. There were many contents in Google Ocean where many video and photo on under the sea, but not real VR experience. If the image of "one ocean and multi-• application" is recognized using smartphone after downloading app. Then the gray whale is moving on the phone, other observer can take a picture on that. It is a just trial for us to apply the ICT technique on issue of Marine affairs. Further applications of VR, AR or Mixed reality will be developed in the consideration of the effectiveness of the games for education purposes.

1. Outreach web site for students

Outreach Working Group

www.http://gebco-outreach.net/ **GEBCO for High School and College Student** \checkmark Buy a software for anti-virus

✓ Vulnerability tests have been done

✓ Administrative pages were moved to another server

✓ Linkage check for updating material on the website



GEBCO.net

2. GEBCO World Map Sliding Puzzle



How to approach GEBCO world map puzzle?

: approach to outreach homepage -> Playing-> GEBCO World Map Puzzle (http://ziin2010.iptime.org)



2-4. How to play the puzzle

What are the goals for this puzzle?

- 1. Within a given time limit, complete the puzzle 2. Understand the continuous and abrupt changes in bathymetry
- puzzling





a combination puzzle that challenges a player to slide (frequently flat) pieces along certain routes (usually on a board) to establish a certain end-configuration. The pieces to be moved may consist of simple shapes, or they may be imprinted with colors, patterns, sections of a larger picture



2-1.13 realms of GEBCO World Map

13 realms of GEBCO World Map





Select one of 13 realms 9. Caribbean . North Atlantic 10. Hudson Bay . Indian 11.North Pole 3. North Atlantic Ocean 12. Greenland and Norway . South Atlantic Ocean 5. North Sea and Med. 13. Antarctica 6. East Asia 7. Southeast Asia 8. Southwest Asia/East Africa

2-3. Description of the puzzle UI



Playing the puzzle





1.Choose one of the realm. 2.Each realm has a ship symbol. 3. The selected realm will be shown on the screen. 4. Choose a number of grid. (3x3 to 5x5) 5. click the Play button!



How to move pieces of the puzzle?

1. Puzzle piece can be moved by clicking up and down and right and left 2. Empty space should exist, the neighboring piece can move side by side with common edge



- Four ways to move!

3. Experience of VR

Experience of VR under the sea

: http://www.khoa.go.kr/seaVr/ko/vr.html?type=type13 More information can be attached to icons and markers.



4. Virtual Reality, Augmented Reality and Mixed Reality

VR AR Mixed Reality

VR(Virtual Reality)

Concept: With closed HMD(Head mounted Display) devices. Virtual reality can be experienced



Control: Using control console

Applications



AR(Augmented Reality)

Concept: Using a combination of real world & virtual world marker and location information, more information will come out at the site



Control: Using smart phone, google glass, console

Applications



MR(Mixed Reality)

Concept: Combination real world and virtual world, Interaction among the two worlds using penetrating HMD



Control : Using gesture, controller console

Applications



5. Further Applications of New Technologies

Further Applications of New Techniques



Eurostar : immersive experience Eurostar travelers can explore the sea floor around them



Sunkenus the hidden object VR game that takes students under the sea

When we have collect all the bathymetric data of the earth, we will be able to use in making games in order to get used to marine environments with fun.

6. Conclusion

We have developed Sliding Puzzle with GEBCO world map. The sub regions can be used for those who have different interests. Distractions in the classroom may be a concern but it is necessary for us to attract students who are familiar to internet and digital environment. Playing the games is one of the communication methods in the future.

We checked the VR applied contents using the bathymetric data and textures and models. People will experience under the sea with manipulation of mouse. In the console games or MMORPG games, additional stories are needed to have people enjoy the data.

Scientific visualization is other issue after the collection of seabed data. It is worth parallel efforts for outreach activities to share the values of bathymetric data and the potential applications.