Creative Accessibility Improvement of All Users in Petra Christian University Library

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Abstract — Learning environment had indirect impacts on student achievement, creating the positive attitudes, higher studying motivation and undoubtedly better performance. The accessibility aspect of the learning place was crucial for educational facility such as University Library in the higher education. On the other hand, because of the old building's design, many users found accessibility barrier in Library @ Petra University's facilities. The accessibility issue for all users was found in FGD, which include persons with disabilities, senior persons, pregnant women as well as children (USER – CENTERED principle). The Redesign of Library @ Petra was proposed based on inclusive design principles. The EQUITABLE BUT REASONABLE USE principle would be grantedby the provision of assistance corner for special users, internal lift, accessible pathways and rotating spaces, accessible meeting areas and accessible toilet. The SIMPLE and INTUITIVE USE was to be fulfilled with braille – visual signage and guiding path for the blind. The LOW PHYSICAL EFFORT was applied in the lift, accessible toilets and assistance to get books in certain inaccessible areas, computers for special users (blind users) were provided for reading, to access e – book and catalogue. The PREVENTION OF USAGE ERRORprinciple was proposed in the voids' 150-cm height railing and anti-slip flooring.

Keywords – **Creative reuse, Accessibility, Disability, Pregnant Women, Senior Person, Children**

1. INTRODUCTION

Learning environment had indirect impacts on student achievement, creating the positive attitudes, higher studying motivation and undoubtedly better performance. (Chan, 1996). [1] One of the aspect of creative and sustainable learning space was the accessibility aspect.

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University Library was an important facility for learning process in higher education. On the other hand, because of the old building design, many users of Library @ Petra University found accessibility barrier inside the facility. The accessibility issue for all users was found during the discussion in Library @ Petra Christian University (which involved persons with disabilities, senior persons, pregnant women as well as children).

Every human rights was found equally important in the United Nations' Convention on the Rights of Persons with Disabilities (May 2008, underlining the persons with disability's rights). Therefore a strategy to empower, to remove barriers(so that they can participate in their community's activities),to get quality education, to find decent work, and and to have their voices heard must be conducted. (Hartley,et.al., 2011). [2]

Disability is a condition of human impairmentwhich happens to almost everyone, whether temporary or permanent. The condition actually increases functioning difficulties, in the older age. And disability became an important feature as the demographics of societies change and more people live to an old age (Zola [1989], Mishra & Gupta [2006] and Lee [2003] as quoted in Hartley, et.al, [2011]). [3] World Report on Disability 2011 has highlighted that more than one billion people in the world live with different disabilities, of whom nearly 200 million experience heavy functioning difficulties. And it was predicted that disability will be a greater concern because of the aging populations and the higher risk of chronic health conditions such as diabetes, cardiovascular disease, cancer and mental health disorders (Hartley, et.al, 2011). [4]

According to Indonesian Regulation: UU Republik Indonesia No. 8 Tahun 2016 (Lawof Indonesian Republic No. 8 Year 2016) [5] The Indonesian government guarantees every citizen, including persons with disabilities that they have the same legal status and human rights with other Indonesian citizens. Therefore this project is very important for improving the capability of lecturers as well as the students in any design for all people. Besides that 1,46 millions of Indonesian is disabled persons (0,74 % from 197 million of total Indonesian population, according to the National Social and Economic Survey showed that in 2000 [Indonesian Statistic Centre Bureau, 2001]). [6]

As mandated in the Lawof Indonesian Republic No. 8 Year 2016 to provide disability service in the educational facility, persons with disabilities (lecturers, students and staffs), senior persons (probably lecturers, staffs and parents), pregnant women (lecturers and staffs), as well as children (lecturers' and staffs' children and visitors) would need equal and safe access to the Library of Petra Christian University (Library@Petra). Therefore, the Improving Accessibility of All Users in Petra Christian University Library program was proposed.

2. LITERATURE AND THEORY

To ensure the success of accessibility transformation in Petra Christian University's Library, several methods were needed to be explored, such as: Universal Design, Inclusive Design and Participatory Design.

Universal design is defined as not only faithful to the accessibility codes and standards, but also produce comfortable design environments for wider users(Nasar, Evans-Cowley. ed., 2007).Some principles of universal design were equitable use, flexibility in use, simple and intuitive use, perceptible information, tolerance for error, low physical efforts, and size and space for approach and use; would improve liveability and quality of life for everyone (Preiser & Ostroff, eds., 2001).[7]

Secondly, Inclusive design was defined as "the design of mainstream products and/or services that are accessible to, and usable by, as many people as reasonably possible without the need for special adaptation or specialised design." Inclusive design should be included in the earliest design process (The British Standards Institute, 2005, quoted in http://www-edc.eng.cam.ac.uk/betterdesign/).[8]

Lastly, Participatory design was a design approach attempting to actively involve all stakeholders (e.g. employees, partners, customers, citizens, end users) in the design process to ensure the product design meets the needs and is usable. And it has focus on processes and procedures of the design (http://cpsr.org/issues/pd/).[9]

Levine, (ed). (2003) suggested library as Cultural Facilities in the NYC Guidebook to Accessibility and Universal Design. Cultural facilities had to provide information and knowledge access to everyone. The site design of the project should provide pathways, loading zones, and parking lot -- which have minimum requirements. Universa; design requirements can improve access to the cultural resources.

Irvall & Nielsen, (2005), suggested a checklist of access to libraries for persons with disabilities. In order to provide equal opportunities for all library

users, a checklist was developed by the IFLA Standing Committee of Libraries Serving Disadvantaged Persons (LSDP). Therefore all parts of the library, the entrance, restrooms, stairs, elevators and special rooms should be accessible for persons with different disabilities. A person in a wheelchair should be able to reach all departments, a visually impaired person should be able to walk with a cane or a guide dog and find his/her way without bumping into obstacles. A deaf person should be able to communicate with library staff. A person with an intellectual disability should be able to find books and other materials easily. A person with dyslexia or other reading problem should be able to find his/her way around. Therefore, a universal design of the library was very important.

Robertson (2012) highlighted the Library as a central service which needed to accommodate all students' needs with different supports for a wide range of diversity. Library staffs should proactively examine their policies and practices to remove barriers for the disabled with: e.g. making accessible formats on the web pages to enable the use of screen-reader software, and longer loan periods to compensate the students with slower reading speed caused by visual impairments or dyslexia. Improvements could also be made by improving signage, layout, renewal methods and instructional guides.

Physical access, signage, acoustics and accessibility should be considered at the planning stage to anticipate people with mobility problems, a range of disabilities, hearing impairments and visual impairments. Physical access was vital since it connects the indoor and outdoor parts of the building; therefore it should accommodate the needs of all disabilities. It is valuable for staff to understand accessibility regulations as well as giving information about widths and heights of various accessibility elements, color schemes and visibility (Robertson, 2012). [10]

The Washington University Library also proposed library services such as a designated staff member and/or committee who coordinates services for persons with disabilities, monitors adaptive technology developments, and responds to requests for accommodation. The University suggested to provide a written description of services for persons with disabilities, including procedures and information on how to request special accommodations. The service required such as: (http://www.washington.edu/doit/universal-access-

making-library-resources-accessible-people-disabilities). [11]

One of accessibility aspects is the room lighting. The lighting would improve the learning performance as well as users' comfort, that could be described as pleasant, colourful, light, modelled, restful, quiet, soft, cozy, relaxing, warm, (Phillips, 2000). [12]

Understanding the importance of the access for all in Library@Petra, a Multi-disciplinary Team consisting Library Management, Interior and Architecture Lecturers were formed and the SERVICE LEARNING courses were redeveloped to facilitate all users including persons with disabilities, senior persons, pregnant women, as well as children.

3. DATA AND METHODS

Table 1 Methods and Outputs of the Program

No	Activities	Outputs
1	Literature Review	Database of Users Spectrum of Petra Christian University
2	Mapping of all users spectrum (including person with disabilities, senior persons, pregnant women and children) in Petra Christian University (PCU)	Interview
3	Documentation of Petra Christian University (PCU) library accessibility	More empathy from the librarians, lecturers and students towards person with disabilities
4	Sensitivity training for librarian, lecturers and students to understand all users' needs (including person with disabilities, senior persons, pregnant women and children)	Library Accessibility Audit
5	Student's Universal Design for User Assistance Corner (serving person with disabilities, senior persons, pregnant women and children) in Petra Christian University Library	Users Assistance Corner
6	Architectural Model Making for Workshop support	Model for Workshop

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No	Activities	Outputs
7	Participatory Workshop for Library Design with students	Design inputs from students
8	Participatory Workshop for Library Design with person with disability	Design inputs from persons with disability
9	Participatory Workshop for Library Design with senior persons	Design inputs from senior persons
10	Participatory Workshop for Library Design with pregnant women and children	Design inputs from pregnant women and children
11	Lecturer's Universal Design of the library (for person with disabilities, senior persons, pregnant women and children) [including lighting and interior design]	Accessible Library Design (6th floor and User Assistant corner)
12	Professional Video Shooting and Editing	Video of disability service corner and profile of Petra's students with disabilities
13	Create assistance program for people with disabilities, especially in adaptive technology and simple accommodation that would be developed in disability service corner	Assistance program, especially in adaptive technology and simple accommodation that would be developed in disability service corner
14	Conduct creative campaign for User Assistance in Library @ Petra Christian University	Website, bulletin, more empathy from all students
15	Conduct creative campaign with accessible library design guideline for Government's Libraries and Community Libraries (simple guideline)	Accessible library design guideline for Government's Libraries and Community Libraries (simple guideline)
16	Final Reporting	Final report

Literature review was conducted by lecturers and students involved in the program. Accessible standards and library standards were evaluated. Case studies were also collected from several secondary data to support /prescribe accessible library design guidelines. Unfortunately, many literatures only covered universal design standards for developed countries. Only a few researches in accessible education / facilities were found. Many of them portrayed the accessible design for developed countries which were expensive to implement. Some papers were found compatible because of the level of accessibility prescribed. In NY Urban design guidelines, two level of accessibilities prescribed (Universal design and accessible design). On other standards, visit-able design and accessible design were introduced. But, it could be concluded that for old buildings such as Library @ Petra, there were certain locations that could not be 100% accessible. So the main areas such as receptions, catalogues, special collections should be 100% accessible. The other areas could be visited or visit-able.

In the process of the users' spectrum mapping in Petra Christian University, several users with special treatment were found in the PCU campus. The PWDs became the important spectrum in campus. The number of PWDs in Petra that could be found are quite numerous. Mostly because of sports accidents, traffic accidents or diminishing health, so they became temporarily disabled. The temporary PWDs were found in the PCU students, PCU staffs as well as guests arriving in Petra.

All users of Library@Petra including persons with disabilities, senior persons, pregnant women, as well as children would benefit from this program. The persons with disabilities were still a minority in Petra. Some spectrums found were the wheelchair users, crutch users, deaf as well as partially visual impaired persons. Persons with temporary disabilities were occasionally found. They were facing temporary disabilities because of sports accidents or traffic accidents. Therefore, their safety aspect should be improved in the Library@Petra.

Documentation of PCU Library and simulation as PWDs were conducted in August 2016 and January 2017. The documentation were conducted involving Architecture and Interior Students. The general documentation was executed to find problems and possible conceptual solutions. Meanwhile, simulation as PWDs was conducted to understand the limitation of design as well creating empathy in the students mind.

Figure 1. Documentation and Simulation as PWDs

Figure 2. Documentation and Simulation as PWDs

In January 2017, a more well-rounded documentation was conducted by lecturer and 2 students from Architecture Dept. to draft the existing buildings and existing furniture. It was conducted to utilise the existing furniture in the building as much as possible. This step also in line with the Green campus concept adopted PCU leaders in 2010.

Student's Universal Design for User Assistance corner layout redesign, lighting redesign were conducted in September – December 2016. The design was conducted by KKP Desain Inklusi (Inclusive Design Service Learning course), and Sosiologi Desain (Design's Sociology), Sains Tata Cahaya (Lighting Design Science) in first stage.

Figure 3. Students' universal design process

Figure 4. Review of Students' universal design with Dr. Arina and Senior Persons in PCU

The lecturer's Universal Design was conducted in January – March 2016. The design was conducted in integrated term (Interior – Architecture and Library management). The scope of the design involved the layout redesign, the assistance corner furniture design, the lighting redesign. Unfortunately because of time limitation, only 6th floor that got redesigned in detail. The 5th, 7th and 8th floor were only considered / designed generally. Additional lift were proposed to create accessibility to all floors.

The participatory design workshop were conducted several times involving students, persons with disability, senior persons, pregnant women, women with babies and also children. The workshops were differentiated for sensitivity training, initial need assessment, and final design review. The sensitivity training were conducted in January 2017 (for librarians) and in February 2017 (for students). The sensitivity training involved experts of disability services such as Dr. Arina, Mr. Tutus MPd., Mr. Syukur and Mr. Sulendra.

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Figure 5. The sensitivity training for librarians and students

Figure 6. The participatory design workshop involving students, persons with disability, senior persons, pregnant women, women with babies and children

Figure 7. The participatory design workshop involving students, persons with disability, senior persons, pregnant women, women with babies and children

The need assessment workshops were conducted in October / November 2016 two times. The first workshop involved students and person with disabilities (The PWD with visual disability, PWD with physical disability, wheelchair and crutch users). The deaf PWD were not involved because of limited availability of PWD. Beside that the limited impact to the design were found such as: signage design and alarm light as the sign of emergency. The second workshop involved students, senior persons (lectures), pregnant women and women with babies (female lectures), and children (elementary school –

children of staffs and lectures). The workshops gathered the needs of special users.

Figure 8.The person with physical disability and parent contributed to participatory design workshop

Figure 9.The senior persons contributed to participatory design workshop

Figure 10.The architectural model as media for participatory design workshop for explaining to persons with visual disability

The final design review (participatory workshop) was conducted in March 2017 involving all special users spectrum. The workshop produced confirmation and positive inputs to refinement of the design. To create a successful communication, an architectural interior - architecture model was prepared by students. The models were used for design communication with PWD with visual disability.

Professional photo and video shooting was conducted from August 2016 to May 2017. The documentation was conducted by professional to

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create a campaign video. The video would be published in inclusive design (https://desaininklusiukpetra.wordpress.com/) blog as well as Library@Petra website, and exhibition of the program in Library@Petra.

Professional 3D illustration and professional interior Architecture modelling were also conducted in April – May 2017. The professional results would enhance the impact of the accessible design to the librarians, architects, interior designers and High Educational Institutions Leaders in Surabaya so they would attend the seminar. The seminar would be held in August 2017.

The guideline of the Accessible University's Design was proposed with illustration. The design was adopted from the participatory design process. The guideline would be disseminated through Library @ Petra website to be downloaded by many campuses librarian / campuses structural leaders. The design illustrated the universal as well as accessible design. The prescription would be implemented in the old library building as well as new library. The guideline also would be disseminated through seminar in August because we need to confirm the time availability with campuses structural leaders (Vice Rectors Forum of East Java).

The creative campaign for user Assistance Corner in Library @ Petra was conducted in April – May 2017. The publication was disseminated through Library @ Petra, DIVO (Digital Media of PCU) as well as through mass media. The campaign was started in 12th of April 2017. It involved 4 special users to try to borrow books, to access the library service, assisted by librarians and 8 students. Lastly, several papers and final reports would be written to report the process of the program.

Figure 11. The creative campaign for user Assistance Corner, with service for person with disabilities and senior persons

Figure 12. The creative campaign for user Assistance Corner, with serving person with disabilities and senior persons

Figure 13. The creative campaign for user Assistance Corner, with serving person with disabilities and senior persons

Figure 14. The talking computers serve persons with visual disabilities

Figure 15. The exhibition of research – action results

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Figure 16.The exhibition of research – action results and visitation from UBCHEA

4. RESULT AND DISCUSSION

The Layout Redesign of Library @ Petra was proposed following the inclusive design and universal design proposal. The design was produced following the USER – CENTERED principle, considering the need of persons with disabilities, senior persons, pregnant women, women with babies and children. The design considers social accessibility as well as physical accessibility.

The Library @ Petra was located in Radius Prawiro Building (In Building) 5th, 6th, 7th, and 8th floor. The library could be accessed in the 6th floor, but the other floor could not be accessed by lift because the security measures implemented by Library @ Petra management. Therefore to fulfill the EQUITABLE USE BUT REASONABLE, an internal lift was proposed in the future. The lift was going to be proposed in the shaft / void in the centre area of the library.
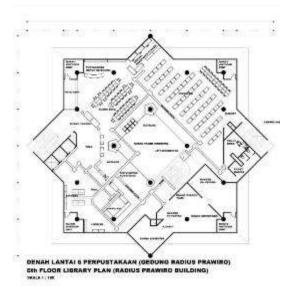
The EQUITABLE USE BUT REASONABLE Principle was also implemented with providing accessible pathways / corridors (clear width of 100 cm) and rotating space (with 150 cm clear width radius). This pathway and rotating spaces reduced the sitting areas and some storages in the building. On the other hand, more meeting areas (open or secluded) were provided to facilitate discussion in the Library. Accessible toilet was proposed replacing male toilet in the 6th floor.

The third principle applied was SIMPLE and INTUITIVE USE. The principle was applied with a proposed simple circulation. The circulation could not be changed but could be simplified and emphasized with signage for all users and guiding path for blind users. The assistance corner for special users was located in the back of the sitting area in library, but it was emphasized with other tool (sign and guiding path).

The fourth Principle of LOW PHYSICAL EFFORT was applied with a proposed lift, accessible toilets

and assistance to get books in the inaccessible bookshelves. On the other hand, important books such as reference could be accessed in 6th floor. Additional computers for special users (especially blind users) were provided to assist them reading and accessing e – book and catalogue website.

The fifth Principle PREVENTION OF USAGE ERROR was proposed in the voids and the newly-proposed accessible toilets. The voids was protected with glass railing. The railing was proposed with 150 cm height. The accessible toilets would be equipped with railing, anti-slip floor, sitting toilet and sliding doors.
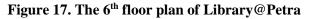

Figure 17. The 6th floor plan of Library@Petra

Figure 18. The Main Entrance of Library@Petra in 6th floor

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Figure 19. The Lobby and Circulation Desk

Figure 22. The Sitting Area and Reference Desk

Figure 20. The Locker for keeping users belonging

Figure 23. The additional desk lighting for Sitting Area

Figure 21. The Temporary Exhibition Space in 6th floor

Figure 21. The Temporary Exhibition Space in 6th floor

Figure 24. The Special Assistance Corner in the 6th floor

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Figure 25. The Special Assistance Corner and Special Catalogue (Talking) Computers

Figure 26. The Bookshelves and corridors with 1m clear width

Figure 27. The Future Internal Lift for Special Users

Figure 28. The Toilet for Persons with Disabilities

Figure 29. The Railing in 7th Floor with 150cm height

So it can be concluded that the new layout was proposed considering inclusive and universal design principles. The physical improvement to the Library@Petra would be proposed gradually to accommodate especially the PWDs, and as an application of Indonesian Law no 8 year 2016 on Person with Disabilities.

5. CONCLUSION

Library@Petra as the university library affected the student especially in the accessibility aspect. On the other hand, because of the use of existing building, accessibility barriers were present. The accessibility issue for all users was found involving persons with disabilities, senior persons, pregnant women, women with babies and children. The new layout of Library @ Petra was proposed following inclusive design and universal design principles in the creative participatory program.

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