

# Learning Space for Libraries in the 21st Century: Perspectives from the Center for Library Resources and Educational Media, Walailak University

Nattagan Sangkaew<sup>1\*</sup> and Pasit Leeniva<sup>2</sup>

<sup>1</sup>Lecturer and <sup>2</sup>Assistant Professor  
School of Architecture, Bangkok University, Pathum-Thani, Thailand 12120

\*Email: nattagan.s@bu.ac.th

## Abstract

This study aimed to explore the need for collaborative spaces in libraries and provide practical guidelines for their design and usage. Data were collected from 17 interviewees and 168 survey respondents who shared perspectives on enhancing 21st-century skills. Based on the findings, the study proposed recommendations for designing shared spaces in libraries, including meeting rooms, group work areas, computer desktop zones, and service points for snacks and beverages. Three key design principles emerged: zoning, flexibility, and creating a creative environment. These principles offer a comprehensive framework for designing collaborative spaces that meet diverse needs and foster active, engaged learning. Libraries are evolving into vibrant learning environments, and these guidelines provide valuable insights for designing collaborative spaces that cater to evolving demands. The recommended design elements include meeting rooms, group work areas, computer desktop zones, and service points for snacks and beverages. The design principles emphasize clear spatial separation, flexibility, and fostering a creative environment. Implementing these suggestions transforms libraries into hubs of collaboration and active learning. This research provides valuable insights and recommendations for designing collaborative spaces in libraries, enabling them to play a crucial role in supporting learning and skill development for users. Libraries should adapt to meet evolving needs, with an emphasis on creating spaces that foster collaboration and creativity, including diverse areas, and designated zones for quiet and privacy. Continuously enhancing these spaces will help libraries stay current and responsive to evolving user needs.

**Keywords:** Learning Spaces, Library, Collaborative Spaces, 21<sup>st</sup> Century

**Received:** June 18, 2024; **Revised:** November 21, 2024; **Accepted:** December 19, 2024

## 1. Introduction

As the digital age continues to advance, libraries are encountering new challenges in providing resources and services to their users. With easy access to online information available 24 hours a day, the traditional role of libraries has been impacted (John, 2016). Library users, particularly students and teachers, expect seamless and efficient access to information (Seal, 2015). As a result, library design must be reimagined. While libraries were once primarily used for research and leisure reading, the increasing shift towards digital information has resulted in decreased demand for physical storage spaces and increased demand for collaborative workspaces that foster creativity and experimentation (Grigsby, 2015).

Notably, university libraries are facing declining usage as students opt for alternative learning environments such as large bookstores that offer comfortable lounge areas, music, and meeting areas (Seal, 2015). Dos Santos (2023) suggests that the way learning spaces are designed can influence the development of a wide range of skills.

To address this issue, it is imperative to transform libraries into spaces that promote the development of essential skills and qualifications required for the 21st century.

This research area focuses on the Walailak University Library in Thailand, which has experienced a decline in user numbers from 262,062 in 2016 to 103,155 in 2021. The library previously only offered reading areas with limited space for group work and experimentation, resulting in issues such as noise, poor lighting, and inconvenient service points for snacks and beverages. The university recognizes the challenges related to student usage and has implemented policies to transform libraries and learning spaces in alignment with the principles of 21<sup>st</sup> century learning environments.

To enhance the development of students' 21st century learning skills, it is crucial to focus on learning and innovation skills such as creativity, critical thinking, communication, and collaboration (Yu et al., 2019; Anagun, 2018). Space design and facilities are critical factors in promoting effective learning (Pearlman, 2010), and the design of collaborative spaces in libraries plays a pivotal role in enhancing learners' skills. In addition to quiet study spaces, modern libraries incorporate areas for collaborative group work, technology-enabled access to information, and food and beverage service points, creating a dynamic and inspiring environment (Pearlman, 2010; Seal, 2015).

As libraries shift from being book repositories to becoming spaces for gathering and exchanging information, it is essential to design libraries to meet the changing needs of users (John, 2016). Librarians play a crucial role in providing data that fosters learning and promotes social interaction and knowledge building (Seal, 2015). Designing libraries to encourage diverse and unconventional working styles is a priority for architects and designers, who must create collaborative spaces that facilitate learning activities and inspire new ideas for work (Grigsby, 2015).

This research aims to explore the use of collaborative spaces in libraries to promote the development of 21st century learning skills. It begins by studying the needs of library users, leading to the design of library space usage. This research will provide recommendations for designing and developing libraries that attract and engage users in learning activities and promote social interaction, research, and collaboration.

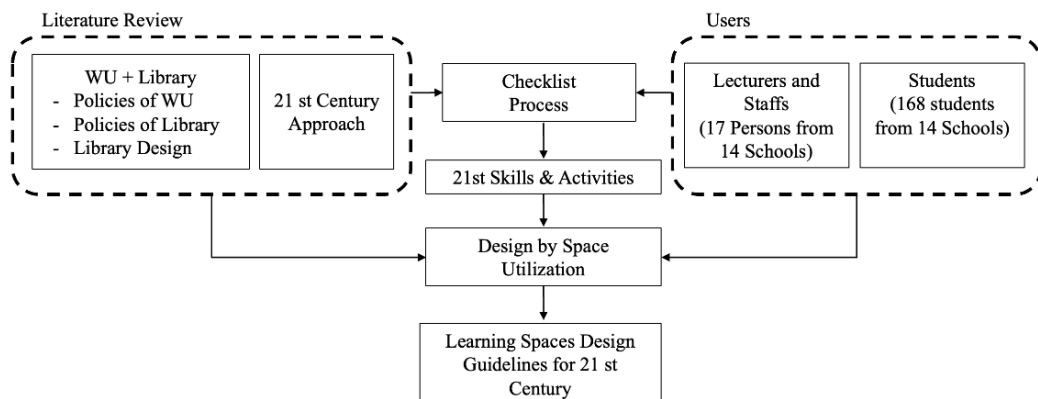


Figure 1 Research conceptual framework

## 2. Objectives

- 1) To study library design theory and the concept of 21<sup>st</sup> century learning spaces.
- 2) To study the needs for space utilization for collaboration by analyzing data from current learning activities.

3) To suggest design recommendations for the collaborative spaces in the library that meet the 21st Century learning skills.

### 3. Literature Review

This research investigates three key aspects of library design: 1) learning activities in the library, 2) principles of library space design, and 3) designing space to allow learners to acquire learning skills in the 21st century.

#### *3.1 Learning Activities in the Library*

According to studies about learning activities in 22 university libraries in the United States and Canada between 2001 and 2006, it was found that most library programs allocated spaces to support four types of academic activities, in order as follows 1) collaboration, 2) individual education, 3) learning according to the course objectives in the university, and 4) temporary classes taught by on-campus teachers (Head, 2016). Moreover, based on the students' point of view library activities that implemented their learning were 1) reading discussion, 2) topic discussion, 3) book reviews, and 4) other activities such as organizing treasure hunting games (Santos et al., 2016). When doing activities in the library, learners / service users could also collect and rearrange furniture to work together on their assignments. They could use digital tools, computers, and software to support their work creations. There were small group meeting rooms and spaces for both individual and group study in the library (Head, 2016).

One such resource is the university library. The library is a vital part of any educational institution, and it has the potential to play a significant role in facilitating active learning. However, the library must be supported by regulations and resources to effectively create an active learning environment (Yudhawasthi & Christiani, 2021). One of the key elements of an active learning atmosphere is the availability of facilities and resources that support active learning. This might include things like study spaces that allow for group work and collaboration, access to technology that facilitates interactive learning, and resources like textbooks, articles, and databases that are up-to-date and relevant to the material being studied. In addition to these physical resources, it is also important for the library to have a staff that is prepared and willing to support active learning. This might involve librarians who are trained in the latest technologies and teaching techniques, or who are knowledgeable about the specific needs of different types of learners.

#### *3.2 Principles of Library Space Design*

A new type of academic library created around the world has succeeded in combining exciting and inspiring architectural design with great functionality (McDonald, 2006). Architects and librarians need to work together to apply that knowledge and understanding to the design of unique environments and learning needs (Head, 2016). Therefore, the library space should attract both the users' mind and the spirit of the university (McDonald, 2006). The most "successful" design is the simplest design. Open spaces across the slab and connections that give users the freedom to change their usage patterns are not the easiest design because open spaces are often noisy. Abbasi (2014) mentioned the difficulty of maintaining a quiet environment and suggested attaching signs that represent different zoning areas, wall partitions, and the use of soundproofing materials.

However, the design of the library space should also focus on sunlight, natural ventilation, cultural art, and security, access by handicapped, training in information searching skills, and preparation of electronic document services as well. A study of Head (2016) showed librarians and architects shared a list of the most frequently used terms in planning and designing academic library spaces in the following order: collaborative, interdisciplinary, flexible, functional, active learning, welcoming, open, social, transparent, and agile. Therefore, library spaces should use these concepts in designing to achieve the nature and the use of space for such activities. The expectation of students and teachers about a library is a quick access to information and a convenient place for

working alone or collaborating with friends (Seal, 2015). A library should be a single space with multiple social environments to facilitate different types of conversations.

Some users need space for individual study while drinking in some areas is also popular with certain groups of users. Students can come to work alone, work in groups with friends or meet and work with teachers (Head, 2016). The division of space into different zones is therefore important. Each zone should have privacy in order not to interfere with each other. While the importance of printed books in libraries may be questioned in the digital age. The survey conducted by Michalak and Rysavy (2023) demonstrates that students still prefer printed books and value the traditional functions of libraries, such as quiet study spaces. By using survey results to inform changes in library design, libraries can create spaces that better serve the needs of their users and improve the overall student experience. Another important aspect of library learning spaces is to connect students to the technology that accesses information and learning in their curriculum, complementing classroom activities, and creating experiences that are conducive to student learning. Ultimately, the emphasis is on holistic learning that can take place both inside and outside of the classroom (Head, 2016).

### *3.3 Designing Space & Learning Skills for the 21st Century.*

The learning and innovation skills in the 21st century learning comprised of four skills which are Critical Thinking, Communication, Collaboration, and Creativity. In addition to asking the question of "What knowledge and skills do learners need for the 21st century?" in designing a space for development of skills in the 21st century. The real design requires answering the following questions (Pearlman, 2010).

- 1) What activities and experiences promote learning in the 21st century?
- 2) How can technology support teaching and evaluating collaborative learning environments in the 21st century?
- 3) How will the physical learning environment promote student learning in the 21st Century?

In designing a space for the 21st century learning skills, this research focuses on three areas which are creativity, collaboration, and reflective as follows:

### *3.4 Designing a space to develop creativity.*

Today's students like flexibility to make them feel empowered to create their own work (Dziuban et al., 2004). Creative space design should enable learners to experiment with creative skills through learning from experiences and project. McCosker & Wilken (2012) also suggested that café spaces were places that encouraged sensory experiences through smell, taste, music, conversation, and green spaces. This represents an increased promotion of creativity. (Lichtenfeld et al., 2012).

Designing creative spaces requires a balance of flexibility, inviting atmosphere, accessible tools, and user involvement. These spaces should accommodate various activities, foster collaboration, and stimulate creativity through thoughtful organization and aesthetics. Ensuring accessibility to resources while maintaining safety is key, and integrating natural elements can further enhance creative thinking. By encouraging community interaction and aligning the design with the space's purpose, organizations can create environments that inspire innovation and meet the diverse needs of their users. (Thoring et al., 2018)

### *3.5 Designing a space to develop collaboration.*

The younger generation faces problems with alienation and internet addiction. This is a side effect of using technology (Laura et al., 2008). Teachers should provide collaborative workspaces and student projects to enable learners to develop high-quality relationships with their peers (Karakas et al., 2015). It highlights the importance of active participation by librarians in the learning process and collaboration with students to create successful learning environments such as "Learning Commons". The article emphasizes that librarians need to go beyond promoting information literacy and work as partners in a collaborative learning environment (Ozburn et al., 2020).

### *3.6 Designing a space to develop reflective skills.*

The new generation is being dominated by the volume and speed of data in the digital ecosystem. This creates a feeling of not keeping up with rapid trends, forgetfulness, feeling tired and easily distracted (Tapscott, 2008; Howard, 2010).

Reflection is an important skill that helps students to manage those difficulties. Goldman (2009) stated that teachers should design spaces for busy students and workaholics who like to multitask. Teachers should also deal with “Being in the moment” (Ramsey & Fitzgibbons, 2005) and demonstrate mindfulness and attention to work (Karakas et al., 2015).

In summary, the design of library space utilization should consider the learning activities that occur in the library, such as individualized study, work collaboration, group discussion, data retrieval and playing group games. The principle of library design should still be an open space with nature view, and zone the work area according to the noise generated. It's a thought-provoking and inspiring space and can show the identity of the university. Library spaces also contribute to the development of the 21st century learning skills. For example, areas with drinks, snacks, soft music, and green spaces will help develop creativity. The spaces providing for work collaboration will help develop intimacy among friends and spaces that can multitask at the same time. There are moments for users to stop and reflect while doing those tasks.

## **4. Research Methods**

This research uses a qualitative approach to understand the phenomenon from the perspectives and experiences of those involved. The research methodology details in each section are as follows:

### *4.1 Data Collection*

To identify what the learning activity should focus on, data was collected from students, teachers, and administrators who are directly involved in determining the format and learning methods. Specifically, the informants are related to 21st-century learning models, particularly in terms of Critical Thinking, Communication, Collaboration, and Creativity aspects. The data providers were divided into 2 groups according to the selection criteria; Group 1 - Interviewees: A total of 17 people, consisting of 1) 3 faculty administrators and 2) 14 teachers from 14 faculties. Group 2 - Survey respondents: 168 people, selected a specific sample group with the following qualifications:

1) Faculty administrators (3 Persons) were selected from 14 faculties. The staff members who have at least 3 years of work experience were selected to obtain individuals with teaching perspectives and experiences to develop learning skills in the 21<sup>st</sup> century.

2) Teachers (14 Persons) were selected from teachers in general education subjects to develop skills for the 21<sup>st</sup> century. Personnel with at least 1 year of experience in education were selected to obtain individuals with knowledge and expertise in teaching activities to develop learning skills in the 21<sup>st</sup> century.

3) Students (151 persons) were selected from students in general education subjects from 14 faculties, with representatives of 10-12 students from each faculty who have practical experience using the library. This was done to explore the need for collaborative learning space in the library, which promotes learning skills in the 21<sup>st</sup> century.

### *4.2 Data Analysis*

The data collected from the interviews and survey questionnaires were analyzed using content analysis to identify themes and patterns of the participants' perspectives and experiences. The research tools used are unstructured interviews and open-ended questionnaires. The unstructured interviews are focused on activity patterns and learning characteristics for developing 21<sup>st</sup> Century learning skills in creativity, analytical thinking, communication, and collaboration. The open-ended questionnaires cover general information such as faculties,

years, fields of study, and experience in teaching activities, as well as characteristics of learning activities and 21<sup>st</sup> century learning skills.

## 5. Research Findings

The results of interviews and questionnaires on activities used to develop learning skills in the 21st century from 14 faculties of Walailak University can be used to summarize current activities and learning styles. This data can be used to analyze the needs for library spaces as follows:

### 5.1 *The Needs for Library Spaces*

The needs for library spaces to accommodate activities for development of learning skills in the 21st century. The researcher selected the top 4 activities for each skill based on the summary of activities chosen by 168 respondents. The details of each activity were presented as follows:

1) Online study: Online studies help students to gain new knowledge from multiple perspectives. Students will analyze their work and select the information that meets their requirements, screen information rationally and critically, consider various aspects, synthesize the strengths/ weaknesses, and apply useful knowledge that can benefit them. These processes help develop analytical thinking. The knowledge gained will guide the design which can be used as an inspiration and as a reference in development of ideas/problems solving and applying to their own work. These processes help develop creativity. Students also use online research spaces for brainstorming to sift through the information they find, share the topic, coordinate, and exchange information in the online world. This is a study for group work. These processes help develop collaborative skills.

2) Exchange of opinions: The analysis was divided into two parts. 1) Thinking skills. It was found that prior to exchanging of opinions students would study which information was suitable for discussion, analyze the opinions of others on both old and new knowledge, debate creatively by using their own reasons to compare with others through thinking and breaking of ideas, consider various approaches to success, create new ideas by gathering opinions to improve, develop, extend, or expand their own knowledge. This allows students to see the limitations of their previous knowledge as well. These processes help develop both critical thinking and creativity and 2) Work skills. It was found that when exchanging solutions within a group, students will listen, ask, answer, and understand by using creative communication to talk and present so that other listeners can understand and accept their opinions. Students need to practice both being a good listener and speaker to do their job through collaboration within the group. All members must play a role in working together to help improve, coordinate, and manage time to perform well in group. These processes help develop communication and collaboration skills.

3) Oral presentations: Students must prepare information, be able to pronounce words clearly, choose the right words, and use both spoken language and body language to present ideas or work to others. These processes help develop communication skills. Presentations through oral presentations are expressing ideas that students have practiced many times. Students practice several techniques to present materials that would keep the audience interested. They need to explain complex thought processes to others through the arrangement and opening of the issue interestingly and choose to use words or use rhetoric creatively. These processes help develop creativity.

4) Group work or project: Students use both speaking, listening, reading and writing skills in order to convey their thoughts and build unity among their teammates while working together by being both good speakers and listeners in group discussions to decide which method is appropriate, use communication to show the advantages/disadvantages of the work to be easily understood by the audience in order to develop a prototype, develop experiences together, and allocate work to accomplish the tasks in a timely manner. These processes help improve communication. When working in groups students work together to understand differences between members and to find a common ground and divide duties/work according to everyone's aptitude. Students need

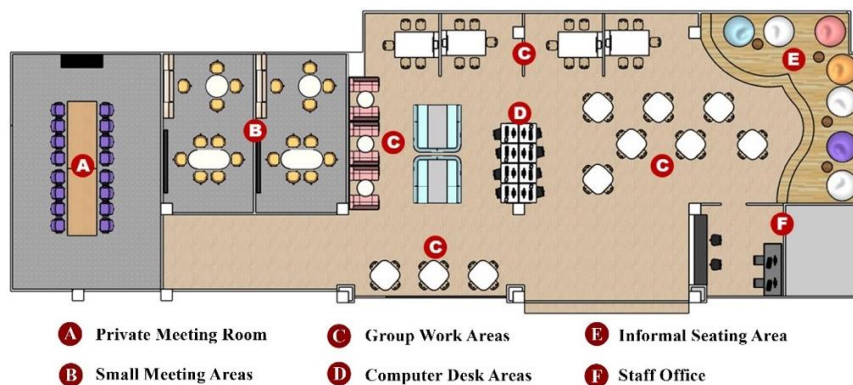
to practice taking responsibilities and a role of leadership-followers, working as a team, and being able to work with others, accepting the opinion, building network and understand that the success of the group is to work together. These processes help develop collaborative skills.

The needs for activities to develop learning skills in the 21<sup>st</sup> century above require spaces for collaboration. What should the spaces look like? Designers are responsible for devising and determining the design guidelines for the use of library spaces in response to such activities. Details on the design will be discussed in the next section.

### 5.2 Library Design Recommendations

To recommend space utilization design based on the need to accommodate activities that support the development of 21st-century learning skills, the researchers formulated a structured and systematic approach to the design of collaborative spaces in libraries. The process began with analyzing user needs through surveys, interviewing and observations to understand the patterns of space usage, preferred learning styles, and common activities performed in the library. This step ensured that the design would be grounded in actual user behavior and expectations.

Following this, the researchers worked on integrating functional areas that support a wide range of learning and working styles—such as individual study, group collaboration, digital research, and informal discussion. This integration aimed to enhance the flexibility of the library environment and ensure it could adapt to various academic and personal needs. Key considerations throughout the process included accessibility (ensuring all users can navigate and utilize the space), flexibility (allowing spaces to serve multiple functions), and the ability to foster interaction among users to support collaborative learning. Based on these steps, the findings were translated into a set of spatial design recommendations, with specific zones designated for different functions, as follows: Zone A for a large private meeting room, Zone B for small meeting areas, Zone C for group work areas, Zone D for computer desk areas, Zone E for a snack and beverage cafe, and Zone F for staff office (Figure 2).



**Figure 2** Design guideline of the first floorplan for the library's co-working space.

From figure 2, the design guideline of the co-working space in the library to accommodate activities for development of learning skills in the 21st century as follows:

1) *Space for learning exchange activity* that located in Zones A, B and C, with both meeting rooms with square tables along with TV screens for presentations that encourages work orders by leaders and opinions by followers, and round tables for 2-4 persons that allow students to meet and exchange ideas thoroughly.

2) *Space for online research activities* that located in Zone D. There are desktop computers facing each other so that students can talk and move their chairs to look at each other screen sometimes. In addition, students can borrow notebook computers at Zone F (Staff Office) to use in various areas as well.

3) *Space for oral presentation activities* that located in the meeting rooms in zones A and B. There are TV screens on the left side of the wall. Students can also borrow notebook computers, whiteboards-pens and post-it papers at Zone F (Staff Office) to facilitate the presentation.

4) *Space for group work or project activities and the case study analysis area* that located in Zone C. Students can use this space to draw pictures, cut paper or sew fabrics according to their projects. Students can borrow scissors, cutters, glues, and papers at Zone F (Staff Office).

## 6. Discussion and Recommendations

The results found that led to discussions and recommendations as follows:

### 6.1 *Space utilization for activities to develop learning skills in the 21st century.*

This study investigated how learning spaces can be designed to improve the development of 21st century learning skills. The findings revealed that libraries play a significant role in providing spaces for learning activities, such as online research, idea exchange, oral presentations, group work, and project work. These spaces correspond to the learning activities in the university library and the activities that students engage in, including discussing and working together, playing games, studying individually, and attending temporary classes taught by instructors.

Head (2016) argued that libraries should have diverse social environments that facilitate different types of conversations. Therefore, it is recommended that libraries should allocate a space for exchanging learning as much as possible compared to other spaces (McDonald 2006). Additionally, this space should be the first area encountered when walking through the entrance door because it can be noisy. Quiet areas for working alone should be separated from these spaces, and it is suggested that they be located on the 2nd floor or at the very end.

In summary, the utilization of spaces for learning activities is crucial for the development of learning skills in the 21st century, particularly in the areas of Critical Thinking and Communication. Libraries play a critical role in providing diverse spaces that meet the needs of different types of learners. Therefore, library managers and designers should allocate spaces that facilitate Critical Thinking and Communicate activities, such as online research, idea exchange, oral presentations, group work, and project work. Additionally, these spaces should be strategically located to enhance their effectiveness and minimize disturbance to other users.

### 6.2 *Recommendations for designing collaborative spaces in libraries.*

#### 1) Clear division of space

Although it is a space for collaborative work, this research also proposes a way to divide the space into different zones which are Zone A for a meeting room that can be a noisy area because it is a closed and soundproof room, and Zone B and C that allow users to talk and make noise. The quiet area is located on the 2nd floor in line with Ellison (2016), it is important to divide the space into different zones. Each zone should have privacy that does not interfere with each other, and Abbasi et al. (2014) suggested placing a sign to indicate space division, wall partitioning and the use of soundproofing materials.

Therefore, the design of the library should be divided into different zones that are suitable for each type of work such as a noisy group, individuals who want silence, computers for retrieving and printing documents, etc. Separation of the space may be partitioned with soundproofing material or parts of the building such as stairs, etc. There should be some signs to remind users of the level of noise allowed in each area for example, "The 2nd floor is for silence, whispering is allowed on the 1st floor."



## 2) Flexible areas

The design of the working space in the library should be flexible. Head (2016) suggested that libraries should allow users to rearrange the furniture and able to use materials/equipment to create work. Learners like flexibility that will feel empowered to create their own work (Hartman et al., 2005). Which was in consistent with John (2016) said, design concept that stated the most "successful" design was the simplest design. Open spaces across the slab and connections that give users the freedom to change their usage patterns (John, 2016).

Therefore, libraries should be flexible in managing high spaces such as tables and chairs that are easy to move. Movable whiteboard mounted to the wall, users can use it to write and exchange opinions or move it to be used as a partition to divide the space to increase privacy. In addition, materials and equipment should be available for creating work in the form of lending, giving for free, and for sale.

## 7. Conclusion

Based on the research conducted, libraries play an important role in supporting the learning and development of its users. As the landscape of learning continues to evolve, it is crucial that libraries adapt to meet the changing needs of its users. One key finding from this research is the importance of providing spaces that facilitate collaboration and creativity. To develop the essential skills required in the 21st century, such as critical thinking, problem-solving, and communication, libraries should prioritize providing spaces for online study, exchange of opinions, oral presentations, and group or project work. These spaces should be designed to accommodate various types of users and activities, from quiet study areas to collaborative workspaces. To facilitate these activities, libraries should provide various functional areas, including private meeting rooms, small meeting areas, group work areas, computer desk areas, a cafe, and staff office areas.

These areas should be designed with flexibility in mind, to allow for easy furniture adjustments and accommodate a variety of different types of activities. Additionally, to enhance creativity and functionality, library spaces should incorporate elements such as green areas, vibrant colors, and thoughtful furniture arrangements. These features, including plants, fish tanks, waterfalls, and areas for enjoying coffee or sweets, create a stimulating environment that fosters inspiration and innovation. Combining aesthetically pleasing designs with practical layouts can make libraries both inviting and conducive to creative breakthroughs. It is also important to ensure that there is a clear separation of space to avoid noise and provide privacy when needed.

By implementing these suggestions, libraries can create a welcoming and productive space that meets the needs of its users and promotes lifelong learning. It is important to note that these recommendations should be tailored to the specific needs and constraints of each library and should be regularly reviewed and updated to ensure they continue to meet the changing needs of its users. However, designing 21st century libraries or learning spaces remains a challenge for designers due to rapidly changing learning models and evolving learning technologies. In conclusion, designing libraries that are adaptable and flexible is crucial for meeting the changing needs of its users. By providing spaces that facilitate collaboration and creativity, libraries can promote the development of essential 21st-century skills and promote lifelong learning.

## 8. References

Abbasi, N., Richard, T., Kenn, F., & Robert, G. (2014). Library spaces designed with students in mind: An evaluation study of University of Queensland libraries at St Lucia campus. In *Proceedings of the IATUL Conferences*. Purdue University. <https://docs.lib.purdue.edu/iatul/2014>

- Anagun, S. (2018). Teachers' perceptions about the relationship between 21st century skills and managing constructivist learning environments. *International Journal of Instruction*, 11(4), 825–840. <https://doi.org/10.12973/iji.2018.11452ad>
- Dos Santos, L. M. (2023). The relationship between environmental, outdoor and field education: A study in rural communities. *International Journal of Instruction*, 16(1), 643–658. <https://doi.org/10.29333/iji.2023.16136a>
- Dziuban, C. D., Moskal, P. M., & Hartman, J. (2004). Higher education, blended learning, and the generations: Knowledge is power—No more. University of Central Florida. [https://desarrollodocente.uc.cl/wpcontent/uploads/2020/03/Knowledge\\_is\\_power\\_no\\_more.pdf](https://desarrollodocente.uc.cl/wpcontent/uploads/2020/03/Knowledge_is_power_no_more.pdf)
- Ellison, W. (2016). Designing the learning spaces of a university library. *New Library World*, 117(5/6), 294–307. <https://doi.org/10.1108/NLW-01-2016-0006>
- Goldman, E., Phillips, M., Riel, C., Shamberger, J., & Turek, C. (2009). Learning in a chaotic environment. *Journal of Workplace Learning*, 21(7), 555–574. <https://doi.org/10.1108/13665620910985540>
- Grigsby, S. K. S. (2015). Re-imagining the 21st century school library: From storage space to active learning space. *TechTrends*, 59(2), 103–106. <https://doi.org/10.1007/s11528-015-0859-5>
- Hartman, J., Moskal, P. M., & Dziuban, C. D. (2005). Preparing the academy of today for the learner of tomorrow. *Educating the Net Generation*. <https://www.educause.edu/research-and-publications>
- Head, A. J. (2016). Planning and designing academic library learning spaces: Expert perspectives of architects, librarians, and library consultants. <https://files.eric.ed.gov/fulltext/ED571288.pdf>
- Howard, E. (2010). *To-morrow: A peaceful path to real reform*. Cambridge University Press.
- John, G. (2016). *Designing libraries in 21st century*. British Council.
- Karakas, F., Manisalıgil, A., & Sarıgöllu, E. (2015). Management learning at the speed of life: Designing reflective, creative, and collaborative spaces for millennials. *The International Journal of Management Education*, 13(3), 237–248. <https://doi.org/10.1016/j.ijme.2015.07.001>
- Laura, R. S., Mitchel, T., & Smith, S. (2008). *The new social disease: From high tech depersonalization to survival of the soul*. University Press of America.
- Lichtenfeld, S., Elliot, A. J., Maier, M. A., & Pekrun, R. (2012). Fertile green: Green facilitates creative performance. *Personality and Social Psychology Bulletin*, 38(6), 784–797. <https://doi.org/10.1177/0146167212436611>
- McCosker, A., & Wilken, R. (2012). Café space, communication, creativity, and materialism. *M/C Journal*, 15(2). <https://doi.org/10.5204/mcj.459>
- McDonald, A. (2006). The ten commandments revisited: The qualities of good library space. *LIBER Quarterly*, 16(2). <https://doi.org/10.18352/lq.7840>
- Michalak, R., & Rysavy, M. D. T. (2023). Fostering change to bolster student success: Renovating the library and reducing stacks to create communal collaborative space. *Journal of Library Administration*, 63(3), 371–385. <https://doi.org/10.1080/01930826.2023.2177927>
- Ozburn, L., Kane, J., & Elliott, T. (2020). Creating collaborative library spaces through partnerships with campus organizations. *Journal of Library Administration*, 60(6), 600–612. <https://doi.org/10.1080/01930826.2020.1748432>
- Pearlman, B. (2010). Designing new learning environment to support 21st century skills. In J. A. Bellanca & R. S. Brandt (Eds.), *21st century skills: Rethinking how students learn* (pp. 116–147). Solution Tree Press. <http://dspace.vnbrims.org:13000>
- Ramsey, V. J., & Fitzgibbons, D. E. (2005). Being in the classroom. *Journal of Management Education*, 29(2), 333–356. <https://doi.org/10.1177/105256290427114>
- Santos, I. M., Ali, N., & Hill, A. (2016). Students as co-designers of a virtual learning commons: Results of a collaborative action research study. *The Journal of Academic Librarianship*, 42(1), 8–14. <https://doi.org/10.1016/j.acalib.2015.09.006>

- Seal, R. A. (2015). Library spaces in the 21st century: Meeting the challenges of user needs for information, technology, and expertise. *Library Management*, 36(8/9), 558–569. <https://doi.org/10.1108/LM-11-20140136>
- Tapscott, D. (2008). *Grown up digital*. McGraw-Hill Education.
- Thoring, K., Mueller, R. M., Desmet, P., & Badke-Schaub, P. (2018). Design principles for creative spaces. In *Proceedings of the DESIGN 2018 15th International Design Conference*, (pp. 1969–1980). Design Society.
- Yu, T. X., Mokhtar, W. M., & Md Ruzanna, M. (2019). Integration of 21st century learning skills (4C elements) in interventions to improve English writing skill among 3K class students. *International Journal of Contemporary Education*, 2(2), 100. <https://doi.org/10.11114/ijce.v2i2.4498>
- Yudhawasthi, C. M., & Chua, L. (2021). Challenges of higher educational documentary institutions in supporting Merdeka Belajar Kampus Merdeka program. *Khazanah al Hikmah: Journal Ilmu Perpustakaan Dan Kearsipan*, 9(2). <https://doi.org/10.24252/kah.v9cf2>