Development of a Library Innovation Assessment Tool: Product Creativity and Customer Perspective

ศศิพิมล ประพินพงศกร[1] *Sasipimol Prapinpongsakorn*
ปราวีณยา สุวรรณณัฐโชติ[2] *Praweenya Suwannatthachote*
จิรัชฌา วิเชียรปัญญา[3] *Jiracha Vicheanpanya*

Abstract

The objective of this study was to develop a library innovation assessment tool. There were two major steps in this research, as follows: 1) to develop criteria and indicators for evaluating library innovation, including scoring and interpretation criteria, and 2) to validate the library innovation assessment tool. The library innovation assessment tool that was developed consists of three dimensions, divided into eight subscales and comprising fifteen bipolar adjective item pairs as semantic differential scaleson 7-point Likert scales. This library innovation assessment tool will be of benefit to teaching and learning. Library teachers can use this tool

[1] Department of Educational Technology and Communications Faculty of Education, Chulalongkorn University.
[2] Department of Educational Technology and Communications Faculty of Education, Chulalongkorn University.
[3] Department of Multimedia College of Communication Arts, Rangsit University.

รับต้นฉบับ 10 ตุลาคม 2560 ปรับแก้ไขตามข้อเสนอแนะของผู้ทรงคุณวุฒิ 18 พฤศจิกายน 2560
รับลงตีพิมพ์ 6 ธันวาคม 2560

to evaluate the performance of students for subjects which focus on the creation of innovation by students and professional librarians. Professional librarians can use this as a guideline in the evaluation of library innovations in different contexts.

Keywords: Library innovation assessment tool, Library innovation

Introduction

Since libraries have encountered unprecedented challenges, innovation has grown to be considered as an indispensable mechanism. Innovation has been broadly defined as referring to ideas, items, or practices from individuals or organizations (Rogers, 2003). The pressure to create innovation in libraries may be due to the impact of reduced budgets and rapid technology change (Brundy & College, 2015). These changes have influenced agencies and companies with the goal to create service innovation for customers as well as affected and interested libraries (Bieraugel, 2015). It is clear that a library is paying attention to innovation when the term “innovation” appears in the mission, strategies, or project names, as well as changes to the library’s products and services. Additionally, research on innovation in libraries and articles dealing with technological innovation, service innovation, and procedure innovation have also been found (Leonard & Clementson, 2012). The library’s major duty and mission is to provide a good service that meets the changing needs of its users or customers, who are the heart of the organization. The key tools that have found acceptance in developing a quality information service institute are to focus on innovation, which may be the tools, devices, ideas, and actions adopted by libraries and information service institutes for the development of organizational management to be effective and appropriate within the changing context and conditions of the organization (Vongsilpa, 2009). This includes improving the output and services of the library to be consistent with the needs and behaviors of its users. Their user behavior has changed greatly from the past due to technology advancement and adaptation to competition. Creativity and innovationis used to

create changes or different services to focus on providing an excellent service, products and innovations that yield the highest user satisfaction. These are the challenges for library management in the creative economy (Makutonrudee, 2011).

From the literature, the definition of "library innovation" can be summarized as referring to ideas, methods, procedures, processes, outcomes, and new devices or anything related to challenges in the operation of the library. This can be made out of original practices, different from the original practices, as well as improving existing ones. The process reflects the concept of service users being important in creating innovations in various ways, such as product innovation, service innovation, and technological innovation. The main objective is to meet the needs of and satisfy the users, as well as to create benefit and add value to the organization. The value of library innovation starts from innovation reflecting the concept of a user-centered service, meaning that the innovation is built primarily on the user or with the focus being on the customer first. With customers at the core, the initiation and creativity of librarians comes into play in providing innovative services. In brief, Library users are the heart of the innovation development in the library (Xiaobin& Jing, 2009; Leonard &Clementson, 2012; Deiss, 2004 cited in Bieraugel, 2015). Examples of library innovation are virtual reference services through the Questionpoint tool or ChatBot; self-check system; Book Hunter which are applications that identify the location of the information resource storage, fine payment applications using mobile payment, and virtual guides which provide a map of the library with audio explanation and 360 degree view, and introduce services (Jange, 2015; Naresuan University Library,2014).

This situation has resulted in the role of librarians being increasingly connected with innovation and technology,meaning they must keep abreast of changes more than ever. Their role is no longer limited to an intermediary for information; librarians are also expected to be involved with innovation. They must know how to access knowledge for the benefit of their work, especially the ability

to produce innovation: just as libraries need to adjust to the changes that come up. It is also what every entrepreneur should have, with libraries being no exception (Katsirikou & Sefertzi, 2000). Therefore, the skills of a modern librarian must also include creative thinking, creating a professional atmosphere for users to accept the innovations that motivate people to use the library, and developing their own expertise to help achieve the organization's goals. Based on the current preliminary survey, it is evident that professional associations are paying close attention and encouraging the profession to make a contribution to library innovation. They are starting with their own department, as can be seen with conferences on a national level that have been run for several consecutive years, such as PULINET national conference. They aim to provide a platform for knowledge exchange and to develop professional staff in libraries and information science field who presented innovations and encourages further development and implementation of the work, while School of Library and Information Science will focus on adapting the learning process and encouraging students to focus on problem-solving and creative skills, which are the foundation that drives innovation. It will be seen that all curriculums require students to work on projects or create a piece of work; however, the piece of work produced often has not been widely used and is not evaluated in a way that emphasizes tangible innovation. Widely-known innovation is often about innovation of education, specifically innovative teaching methods. The most commonly used criteria regarding innovation uses concepts created by the Secretariat Office of the Teachers' Council of Thailand (2015), such as criteria for evaluating the quality of educational innovation in one school, and one innovation of the Teacher Council of Thailand to win the National Innovation Award, with the emphasis on evaluating the quality of work in five areas: 1) academic value, which considers the thought and development process and the results, 2) benefits of innovation, which considers the importance to the profession and adoption, 3) novelty, which considers the prominent features of the work, 4) participation,

which considers the diversity of stakeholders, participation behavior and time, and 5) presentation, which is the consideration of presentation technique, data details, and evidence. Moreover, there are criteria from the Office of the Basic Education Commission, which has conducted a significant amount of research leading to several concepts, and applied the evaluation of innovation indicators. The emphasis is on three concepts: innovation and presentation, innovation development, and the value and benefit of the innovation (Suwancharas, 2010; Hongto, 2010). Meanwhile the PULINET national conference used the criteria to assess the library performance that are evident in the aspects of value and benefit of the library only (PULINET, 2017-2018). Most of criteria of the assessment focused on the process of the innovation development, not on the innovation itself.

The above is a broad assessment without going deeper into the details of the indicators to assess how innovative a product is. There were assessment tools for other purposes such as educational innovation, but the assessment tool which was design specifically for innovation library was not found. The researchers intended to conduct a study on the evaluation of innovation on other dimensions that are consistent with the learning process with creative solutions designed to encourage students to be able to create innovation. The researchers thus focused on studying literature which relate to creative product measurement. It was found that there were indicators for evaluating creative products with dimensions consistent with the creative problem-solving process that the researchers used as a strategy for learning and teaching activities in a project-based learning course. Also, a framework of creative measurement can be used to evaluate the innovation, which includes the learning outcomes of novelty, resolution, and style (Besemer, 2000). From the aforementioned reasons, the researchers were interested to develop a library innovation assessment tool because there is currently no research that has developed a library innovation measurement tool. Therefore, the aim of this study is to use teaching and learning activities in courses that seek to encourage students

to develop creative problem-solving ability and to develop the outcome in the form of library innovation. Besides the library innovation assessment tool to be used in teaching in educational institutions, it can be utilized in wider contexts such as library contexts. The tool can also be used as a guide for professional librarians to use as an indicator in evaluating library innovations. It will be a useful way to see the strengths and weaknesses in each dimension to further develop library innovation in each department.

Research objective

To develop and validate a library innovation assessment tool.

Methodology

The objective of this research was to develop and validate an assessment tool to evaluate library innovation works. The research process is divided into two steps, as follows:

Step 1: The development of a library innovation assessment tool

1. The researchers conducted studies on papers and research related to creativity and innovation assessment, as follows:

Dimension	References
1) Novelty *2) Resolution* *3) Elaboration and Synthesis (Style)* Reviewed related documents and research related to innovation and creation evaluation which consist of three dimensions of evaluation :1) Novelty 2) Resolution and 3) Elaboration and Synthesis or Style which hasa subscale and evaluation lists which depend on the evaluation context.	Besemer & O'Quin, 1986O'Quin & Besemer, 1989; Besemer, 1998; Besemer & O'Quin, 1999; Besemer, 2000; White & Smith, 2001; Puawpanich, 2011; Jansukwong, 2008

Dimension	References
4) Customer/User perception 4.1 Reviewed related documents and research that are concerned with library innovation, and use the information to develop the assessment tool which is suited to the library context. From the study, library innovation creation prioritized customers or users because the libraries want to develop and create innovations to meet the requirements of users, which is the mission and main target of libraries generally. Therefore, the importance of innovation creation focuses on users and puts users at the center. After that, the innovations are created by library staff and become service innovations. The value of innovation is not only in novelty but also in its benefit to users and the values of organizations.	Matthews, 2009; Scupola & Nicolajsen, 2010; Anthony, 2014; Jange, 2015
4.2 Reviewed documents and research that is concerned with the satisfaction of library users in terms of the library and the service. The main purpose of a library is to serve users with the required information and services. Therefore, when the performance of a library is evaluated, the satisfaction of users will be one consideration for the improvement and development of services to satisfy users. Positive attitude or feedback reflect the achievement of the product or service of the library. Moreover, the level of satisfaction of users also affects the level of service, which means if the satisfaction level of users after using products or services is high, users will come back to that library again. Users participate in the decision-making on which library innovations they want. Therefore, the satisfaction evaluation indicator from users is crucially important for quality evaluation of the invention from the library.	Mairaj & Naseer, 2013; Joy & Idowu, 2014; Ball, n.d.; Kiran, 2010
4.3 Reviewed research which has developed product creativity measurement, with subscales for the attention and satisfaction of users to the creations of products that can be applied to evaluate the feedback from users.	Horn & Salvendy, 2007

2. Develop a draft of the library innovation assessment tool by setting the structure and characteristics of the evaluation from the review of related research from point 1. The structure can be classified into four dimensions: 1) Novelty 2) Resolution 3) Style and 4) Customer/User Perception. The conformed subscale and evaluation items are selected. Most of them are in the form of the product and service innovation which were used to develop the draft of the evaluation list by setting the characteristic as a rating scale with seven levels and assign the positive value for a good attitude, as follows: Highest (score=7), High (score=6), Quite High (score=5), Moderate (score=4), Quite Low (score=3), Low (score=2) and Lowest (score=1).

3. Develop the evaluation criteria of library innovation as follows:

3.1 Informal interview of five experts, consisting of three experts in library and information science and innovation management,as well as two other librarians, by purposive sampling to determine the proportion of appropriate scoring.

3.2 Determine interpretation criteria to separate the score of library innovation by applying the innovation evaluation criteria from the Bureau of Educational Innovation Development (2014) and Criterion-Referenced Evaluation of Bloom, Hastings &Madaus (1971) by considering the overall scoreand the evaluation criteria, which is shown as follows:

Scoring criteria	***Interpretation***
80-100	very good
60-79	good
Lower than 60 Score	fair

4. Develop a draft of the library innovation assessment tool according to the setting structure for quality assessment of the evaluation tool.

Step 2: Validating the library innovation assessment tool

1. Evaluate the content validity of the evaluation criteriaby three experts with expertise in innovation and library innovation. The experts determine the validity of content and the appropriateness of the wording by using an index of consistency (IOC) which specifies that only criteria with a mean higher than 0.5 will be used.

2. Test the criteria items informally with 30 library staff and users. They are assigned to evaluate two incomplete library innovations and collect data for checking the understanding and clarity of the assessment tool and method by informal interview. After that, the comments and suggestions will be used to improve the tool.

3. Verify the appropriateness of the weight of each dimension's score by five experts. The agreement has to be made by at least three experts.

4. Verify the rate of agreement of the evaluators by five experts. The evaluators are a teacher from the Library and Information Science program and professional librarians who use purposive sampling to evaluate and rate three library innovations. After that, a rater agreement index (RAI) is calculated. As RAI tends towards 1.0, the evaluators rate in the same direction(Burry-Stock, 1996).

5. Develop the library innovation assessment tool which has been improved and adjusted in an appropriate form and ready to be used to evaluate library innovation.

Findings

1. The results from the analysis and synthesis of the related documents and research leads to the structure and characteristic evaluation of the library innovation. The overall criteria for evaluating comprised of an assessment of four dimensions,12 subscalesand21 bipolar adjective item pairs. The criteria for library innovation assessment summary are shown in Figure 1.The first to third dimensionsare used to develop the library innovation assessment tool to evaluate

the library innovation work of students during the presentation step which is the measurement of the learning outcome. The evaluators are teachers and librarians who participate in learning activities.

Dimension 1 Novelty: Considering the level of novelty in terms of having a new process, method, concept, and the unusual influences on the creation of their own and other people's work. This dimension will reflect the judgment of two subscales, surprise and originality, consisting of bipolar adjective item pairs totaling five items.

Dimension 2 Resolution: Considering the level of problem-solving ability appropriately according to the situation, problem, or challenge of the work. This dimension will reflect the judgment of four subscales: Logical, Useful, Valuable and Understandable, consisting of bipolar adjective item pairs totaling seven items.

Dimension 3 Style: Considering the level of integration of the work in terms of composition, shape, or design: it should be complete and meaningful. This dimension will reflect the judgment of two subscales in the compatibility of the various components and be consistent with 'organic' and 'elegant'comprising bipolar adjective item pairs totaling three items.

While dimension four was developed for use during the improvement of the library innovation, it will be used in the planning and production stage of the innovation creation which tested and collected the feedback from real library users. The evaluation method can be simple consideration, such as in the case that there are any criteria that get a score lower than four or with a total score that is lower than 60%. The student needs to use that result as part of the consideration to improve the satisfaction of users, and use the feedback to improve the product.

Dimension 4: Library users' perception: Considering the level of perception and satisfaction of library users towards the work, this dimension will reflect the attractiveness judgment of four subscales: attraction or centrality,

importance, meeting desire, and emotion, consisting of bipolar adjective item pairs totaling six items. For this dimension, the researchers have considered this as important in helping assess the surrounding area because library innovation is directly relevant to the user, as the main goal of creating or developing innovation in the library is for the user. Therefore, to assess whether the innovation produced was good or bad, the dimensions of the user's satisfaction or mood and the users' attitudes towards product or service should be considered (see appendix B).

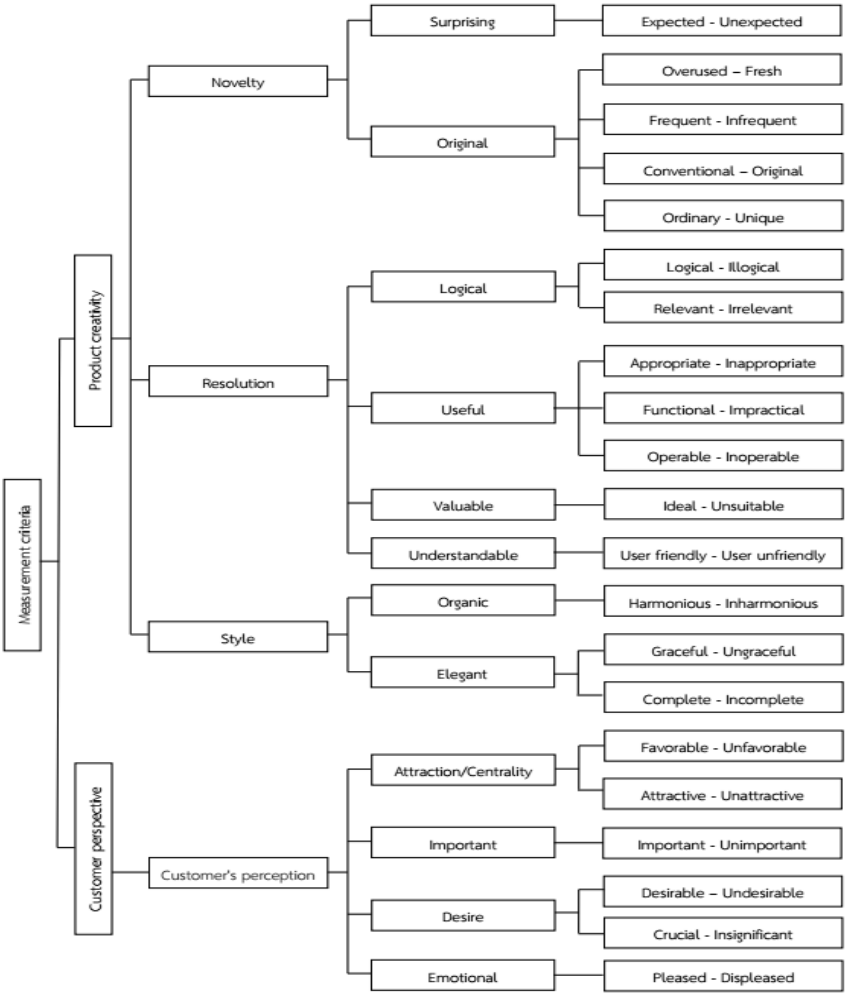

Figure. 1 Chart summarizing the structure of the evaluation items

2. The results of the library innovation assessment tool quality test can be explained as follows:

2.1 The results from criteria selection and content validity by three experts show that they agree with the evaluation items in the overview, and that these items can be used to evaluate library innovation. The mean is between 0.66 and 1.00, with most of the meansat 1.0. There are only three items for which the mean is equal to 0.66 ; however, the experts made suggestions in a similar way. For the style dimension, Well-Crafted does not need to be considered a subscale because the indicator of the subscale focused on product design such as delicateness, expertise and carefulness. That indicator does not match library innovation which focuses on the application rather than the look. This conforms with O'Quin (cited in White & Smith, 2001), who developed creative creation criteria and suggested that the criteria can be applied and adjusted using subscale or item measurement according to the characteristics of the invention, because creation and innovation have various forms and different contexts. Moreover, the experts provided additional feedback which was to adjust the use of Thai words to be more obvious, with English words placed alongside them in brackets, in order to communicate more clearly than using Thai language alone.

2.2 The results from the informal interview from the 30 library staff and library users which the assessment tool was used to test its validity, show that most of them understand the evaluation items and the method. They can score the innovation evaluation easily because an introduction and explanation of the evaluation items, and details of how to score them, are provided. Moreover, they suggest adding a short brief for some items to make them easier to understand and evaluate, as this could save time reading the introduction.

2.3 The results from the appropriateness of the weights of each dimension by five experts show that most of the professionals agree that the weights of 'novelty' and 'resolution' should be equal. For 'style', it should be lower because

it is in the innovation creation phase so the result may be a prototype which is not yet complete. Moreover, there are related factors about the limited budget for the innovation creation. That is why the weight of the style should be lower than the first two dimensions. Therefore, the weight of each dimension should be 1) Novelty 35% 2) Resolution 35% and 3) Style 30%.

2.4 The result from the rater agreement index (RAI) by five experts was 1.00, indicating that the estimated rate was in the same direction. This means that the innovation evaluation model was consistent and in the same direction or constant in evaluation.

3. The results from the development of the library innovation assessment tool:

The library innovation assessment tool was developed with semantic differential scale in terms of bipolar adjectives, 7-point Likert scales which consist of 3 dimensions, 8 subscales, 15 bipolar adjective item pairs used to evaluate library innovation (see appendix A).The details of the evaluation criteria are as follows:

1) Setting the evaluation criteria for library innovation by three dimensions, with each dimension weighted as follows:

Novelty dimension,with a full score of 35 and proportional weighting of 35%

Resolution dimension,with a full score of 49 and proportional weighting of 35%

Style dimension,with a full score of 21 and proportional weighting of 30%

2) Consider the evaluation items by 7-point Likert scales consisting of Highest (score=7), High (score=6), Quite High (score=5), Moderate (score=4), Quite Low (score=3), Low (score=2) and Lowest (score=1).

3) The evaluation criteria of the library innovation is calculated as a total score by the summation of the mean of each dimension with a total weighting of 100% (full score of 100) and interpreted as follows:

Scoring criteria	*Interpretation*
80-100	very good
60-79	good
Lower than 60	fair

The calculation can be done by the following sequence:

1) Consider the score of the items of each dimension (scale 1-7).

2) Calculate the average score of each dimension by summarizing the score of every item and multiplying it by the proportional weighting and dividing by the full score of each dimension.

3) Sum the score of each dimension from point 2. The total score of dimensions will be calculated with a full score of 100 (1 total score of product per 1 evaluator). Then, interpret the evaluation criteria.

4) In the case of multiple evaluators for one work, the work is done by evaluating the score in the same way, but with the result being divided by the number of evaluators, which results in an average score. Then, interpret the evaluation criteria.

Discussion

The finding of this study is the library innovation assessment tool itself because the tool was developed and investigated for validity and reliability. The researchers developed the assessment tool systematically by analysis and synthesis of literature reviews. Moreover, the items and criteria of the evaluation were considered by experts and the tool was tried out by library staff and users, including inter-rater agreement which was examined by a rater agreement index by the experts. As a result, the library innovation assessment tool can be applied in a practical context by focusing on the components of product creativity and customer perspective. For product creativity, it is important and a core component

of every innovation assessment, corresponding with past research because creativity is the beginning of innovation, and an indicator which is used to assess whether it is truly an innovation. Innovation is the result of creativity, so product creativity is used to assess the degree of innovation of the work (Besemer & O'Quin, 1986;O'Quin & Besemer, 1989; Besemer, 1998; Besemer & O'Quin, 1999; Besemer, 2000; White & Smith, 2001; Puawpanich, 2011; Jansukwong, 2008; Boonyam, 2011; Songkhram, 2010; Suwancharas, 2010; Teerawit, 2015).

The customer perspective is important for any innovation creation,not only for library innovation. From the literature review, the development or creation of innovation in the context of business, organization, and education, the end users are the first priority and the innovation developed will be useless if there is no benefit for the users(Matthews, 2009; Scupola & Nicolajsen, 2010; Anthony, 2014; Jange, 2015; Mairaj & Naseer, 2013; Joy & Idowu, 2014; Ball, n.d.;Kiran, 2010). The previous statement agreed with the research of Gomez, Salazar & Vargas (2016), which found that information from internal and external sources such as customers, consultants, and stakeholders are important for innovation development because it requires information from various sources. Moreover, it affects the capability of innovation development, especially the innovation for products and administrative innovation that derives from customer sources. Moreover, this concept corresponds to the concepts of Thailand Creative & Design Center (2014) which states that the foundation of service design is prioritizing users' benefit. Therefore, service design which develops and improves innovation will start from exploration and problem identification. The objective of this step is to know how the service system affects the behavior of users and raise the problems to be solved. Service design has to be based on the users' views; the prototype has to be reflected on and implemented by users or stakeholders to be designed and improved to meet the requirements of users as much as possible. In the context of libraries, product or services are offered based on tradition or on librarians'

estimations of the needs of their clientele (Almquist, 2014). However as mentioned, the value of library innovation starts from the concept of users as the center, which means that innovation has to consider the service, process, and products for users, leading to the creativity of librarians and innovation as the last step. That is to say, the innovation developedis intended to be applied by customers or end users (Xiaobin & Jing, 2009; Leonard & Clementson, 2012; Deiss, 2004 cited in Bieraugel, 2015). In addition, the researchers found that the assessment tool can be utilize in various context including classrooms and libraries. For the classroom, the application is consistent with the experts interviewed were both instructors and librarians in the validation stage. The outcome of the interview stated that some courses, employing project based learning, focus on the creative products of the students with the highlight on the assessment on the style. Using the assessment on product creativity was not found in resolution and novelty dimensions. Therefore, this tool can be used as a guideline in courses with focus on final product. For the libraries, the assessment for novelty, resolution, style and customer perspective was not found. Librarians can utilize this tool as guideline for their library innovation.

Suggestions and implications

1. Instructors, especially in the fields of library and information science, information studies or even courses in other disciplines can use this measurement tool as a guideline for evaluating student performance in various subjects with a focus on creativity or innovation.

2. Professional librarians and related individuals can use this tool as a guideline for evaluating library innovation systematically.

3. It can be used to provide a basis for evaluating during academic conferences or contests, or to present innovations or creative work.

Appendix A: Library innovation assessment tool

Instructions: Please consider your agreement with the adjectives on these scales and circle the score that best represents your ideas.

Library innovation assessment tool											
Work title……...……Evaluator's name……											
Dimension	Weight	Subscales	Level of Agreement								Lowest
Novelty (Total score: 35)	35%	Surprising	Unexpected	7	6	5	4	3	2	1	Expected
		Original	Fresh	7	6	5	4	3	2	1	Overused
			Infrequent	7	6	5	4	3	2	1	Frequent
			Original	7	6	5	4	3	2	1	Conventional
			Unique	7	6	5	4	3	2	1	Ordinary
Resolution (Total score: 49)	35%	Logical	Logical	7	6	5	4	3	2	1	Illogical
			Relevant	7	6	5	4	3	2	1	Irrelevant
			Appropriate	7	6	5	4	3	2	1	Inappropriate
		Useful	Functional	7	6	5	4	3	2	1	Impractical
			Operable	7	6	5	4	3	2	1	Inoperable
		Valuable	Ideal	7	6	5	4	3	2	1	Unsuitable
		Understandable	User friendly	7	6	5	4	3	2	1	User unfriendly
Style (Total score: 21)	30%	Organic	Harmonious	7	6	5	4	3	2	1	Inharmonious
		Elegant	Graceful	7	6	5	4	3	2	1	Ungraceful
			Complete	7	6	5	4	3	2	1	Incomplete

Note: Highest (score=7), High (score=6), Quite High (score=5), Moderate (score=4), Quite Low (score=3), Low (score=2) and Lowest (score=1).

Appendix B: Library innovation assessment tool (For library users)

Instructions: Please consider your agreement with the adjectives on these scales and circle the score that best represents your ideas.

Work title……Evaluator's name……										
Dimension	Subscales	Level of Agreement							Lowest	
User's perception (Total score: 42)	Centrality	Favorable	7	6	5	4	3	2	1	Unfavorable
		Attractive	7	6	5	4	3	2	1	Unattractive
	Important	Important	7	6	5	4	3	2	1	Unimportant
	Desire	Desirable	7	6	5	4	3	2	1	Undesirable
		Crucial	7	6	5	4	3	2	1	Insignificant
	Emotion	Pleased	7	6	5	4	3	2	1	Displeased

Note: Highest (score=7), High (score=6), Quite High (score=5), Moderate (score=4), Quite Low (score=3), Low (score=2) and Lowest (score=1).

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