Work Centered Classification as Communication: Representing a Central Bank's Mission with the Library Classification†

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Abstract: For a special library serving its parent organization, the design and use of classification schemes primarily need to support work activities. However, when the Prince Vivadhanajaya Library at the Bank of Thailand decided to open its doors to the public in 2018, the redesign of classification that serves both internal staff work and the public interest became a challenging task. We designed a classification scheme by integrating work centered classification design approach, classification as communication framework and the service design approach. The design process included developing empathy, ideation and implementation and evaluation. As a result, the new classification scheme, including seven main classes and thirty-seven level-one subclasses and twenty-two level-two subclasses, was primarily based on the organization's strategic plans, mapping with JEL Classification Codes, *Library of Congress Classification* (*LCC*) and *Library of Congress Subject Headings* (*LCSH*). The classification scheme also includes geographical code, author cutter number, publication year, volume number and copy number. Follow up interviews with twenty-three participants were conducted two years later to evaluate user experience as well as the staff's opinion of the new classification scheme. The feedback addressed favorable outcomes and challenges to be used for the next iteration of the library service design process.

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1.0 Introduction

Classification is a primary tool to access and discover resources as well as to learn about topic domains housed in libraries either in analogue or digital formats. While mainstream classification schemes have been used in various types of libraries, there are numerous critiques on their applicability to certain domains and contexts (Olson and Schlegl 2001). Numerous corporate libraries serving their parent organizations have designed and used their classification schemes to support work activities inside their organizations. However, when the Prince Vivadhanajaya Library at the Bank of Thailand decided to open its doors to serve the general public in 2018, the *Library of Congress Classification* (*LCC*) was unable to accommodate the dynamic nature of the work domain in central banking. At the same time, *LCC* lacked the communicative power to portray the domain of knowledge inside the Bank of Thailand to the public. This contradiction manifests the dilemma from the pragmatic and critical approach to classification in that a classification "will always tend to support certain goals and interests at the expense of other interests" (Hjørland 2017, 109).

The Bank of Thailand (BOT), established in 1942, serves as the central bank of Thailand, securing the nation's financial and economic stability through various governing mechanisms such as managing monetary reserves and national assets, governing currency and foreign exchange, setting state-wide interest rates, promoting the establishment and security of payment systems, providing banking services for the government and financial institutions and overseeing and inspecting commercial financial institutions (Bank of Thailand 2017).

The library function of BOT was initiated by H. H. Prince Vivadhanajaya, the first BOT governor, in 1946. The first batch of materials was mainly acquired through personal donations and journal subscriptions from publishers in Europe and the United States. In 1953, the library was administered by a full-time professional librarian, under the supervision of the Economic Department (Sombatsiri 1972). In 1976, the library was restructured as an independent unit named the Library and Information Center serving only BOT staff. In 1978, the Library and Information Center adopted *LCC* to manage its printed collection. A collection development policy was first devised during that period, prioritizing BOT staff as the main target user group, while former employees (e.g., retired personnel) and members of the public with special permission were identified as the secondary target group. According to the policy, the core subject collection (approximately 80% of the entire collection) included research materials in the topics of economics, banking and finance. The rest contained other materials supporting BOT business and operation such as management, accounting, law, technology and language.

To symbolize openness and outreach, in 2018, the BOT established the BOT Learning Center, a public space for people to learn about monetary economics, financial literacy and the role of central banks (Santiprabhob 2018; Limpiti 2018). Repurposed from a banknote printing house, the space has become a common space where the public can engage with the BOT's business as well as learn about the country's currency and financial system. The establishment of the BOT Learning Center was also a restructuring of the knowledge-based units, housing a state-of-the-art money museum, BOT archives and a specialized economic library. The Library and Information Center was relocated and renamed the Prince Vivadhanajaya Library. Its primary target group was expanded to serve, in addition to BOT staff, economic researchers, students and enthusiasts. The secondary target group includes the public as well as students at all levels.

The relocation and the extension of services brought the new challenge for the library to meet the needs of a wider range of users. At the same time, it provided the opportunity to develop new services as well as to improve its existing products and services. Prior to this initiative, the library had occasionally received suggestions and feedback regarding issues with the bibliographic classification and shelving system. For instance, users reported that they were unable to locate materials and some had difficulty when browsing the shelves as they did not understand the shelving system.

Whilst a relevant work centered classification design approach, such as cognitive work analysis (Albrechtsen and Pejtersen 2003), can yield a classification scheme that strongly supports the mission and operations of the bank, such an approach may be alien from the public's perspective. The BOT is concerned about the public understanding and perceptions of the mission and operations of the central bank. Therefore, the redesign of the classification scheme to facilitate multiple utilizations in distinctive contexts has become a challenging task. We aim to exemplify the adoption of both work centered classification design and service design approaches in designing a classification scheme. This paper documents the initial cycle of the design process, particularly regarding the organization of the bibliographic collection. It also demonstrates the solution implemented to address such issues via the introduction of a new classification system that reflects the central bank's mission and activities.

2.0 Literature review and framework

To demonstrate the theoretical and empirical background of this study, this review of the relevant literature is divided into three parts. The first part discusses work-based classification design in juxtaposition to the perspective of classification as communication as a theoretical foundation of the design of classification schemes. The second part lays out

the methodological foundation based on a service design approach. The last part presents the development and use of knowledge organization systems for central bank libraries.

2.1 Work-based classification design as communication

Classification is a common knowledge organization system in libraries and other kinds of information institutions. In spite of the pervasiveness of mainstream library classification schemes, the orientation toward supremacy groups, objectivity and standardization of these schemes brings negative biases in various forms. Based on a content analysis of relevant literature on subject access standards, Olsen and Schlegl (2001) found that inappropriate structure is the most common criticism of these classification schemes, followed by the omission of certain topics, biased terminology, treatment of some topics as an exemption and ghettoization of some topics, respectively. These biases obstruct effective access for heterogeneous user groups as well as misrepresenting numerous populations and entities.

While the design of classification can be described through various methods (Hjørland 2017), the pragmatic and critical approach to classification seems to be appropriate for knowledge organization in corporate libraries. From this perspective, unbiased classification is not possible (for example, Bowker and Star 1999; Beghtol 2001). The design of a classification scheme, from this view, is highly dependent on goals, values, interests, procedures, policies, consequences and contexts of classification and classifiers (Hjørland 2017, 109; Bowker and Star 1999, 321). However, Hjørland (2017, 109) pointed out that while classification is designed to uphold human goals and values, it is developed "at the expense of other interests."

To remedy the dilemma of serving multiple distinctive goals, namely organizational goals and public understanding of the organization's mission, the design of a classification scheme in this study is developed based on a work-centered design of classification (Albrechtsen and Pejtersen 2003) as well as classification as design (Feinberg 2008).

Escalating from the domain analytic approach (Hjørland and Albrechtsen 1995), Albrechtsen and Pejtersen (2003) developed a work centered design addressing the development of semantic structures based on the dynamics of work. From this perspective, the semantic structure is strictly embedded in the social phenomenon of work, including formal and informal socialization and adaptation. The classification schemes serve as tools for knowledge organization, retrieval and dissemination as well as assisting "the actors' mutual articulation of work and their joint decision" (215).

While the diversity of the conceptualization of work domains can be problematical for multi-departmental organizations (e.g., Schmidt 1990; Davenport 2001; Gerson and Star 1986; Star and Griesemer 1989; Albrechtsen and Jacob 1998; Pejtersen et al. 1997), such an issue can even become enlarged when the classification scheme is open to use by outsiders. Based on the multiple perspectives of persuasion, Feinberg (2008) provides a conceptual foundation arguing that classification can be considered as communication. In Feinberg's analysis, classifications can be characterized as persuasive rhetorical discourses based on four types of persuasion—argument, voice, audience and genre—which are exemplified by five classification schemes including the Prelinger Library, the Women's thesaurus, the Warburg Institute classification, the information architecture for the Center for Science and Culture and the DrugSense newsbot concept dictionary. In defending the expressive power of classification, Feinberg (2011, 121) sought to exploit and appreciate the creative expression value of classification, arguing that classifications as a part of information systems have "the potential to express ideas, to be surprising, amusing, even illuminating."

Albrechtsen and Pejtersen's application of a worked centered design of classification schemes (2003), sees cognitive work analysis as an underlying methodological framework. On the other hand, Feinberg's concept of classification as communication (2008) was realized through prototyping classification schemes based on two persuasive discourses. From the methodological perspective, while they are distinctive in nature, both perspectives can be implemented through the analysis of work domains in juxtaposition to the design of rhetorical discourses.

2.2 Service design in libraries

Feinberg (2008) argues that when it comes to designing classification semantics and their structures, the current standard of classification design (i.e., 2005 NISO Standard) is not sufficient to deal with the design of classification semantics and structures in great detail. While there are multiple classification design research approaches ranging from the structured engineering-based approach (e.g., Jacobson et al. 1992) to scenario-based design (e.g., Carroll and Rosson 1992), Feinberg is convinced that the design approach should allow creativity and flexibility of classification in a disciplined and systematic manner to facilitate the development of communicative classification.

A library classification can be considered to be a service (de Jong 2014), facilitating user access and discovery and assisting users to learn about domain knowledge. From the service design perspective, classification is an integral part of an overall library service, rather than a product on its own. Classification schemes and related services (such as online retrieval systems, shelving systems and spine labels) have an

impact on user experience as do other elements of services and products provided in libraries.

The principles of the service design approach are reflective, iterative and user oriented in nature. Such a design approach can be applicable to a classification design that carries multiple design conditions including evolving work domains, expressive power and user interest and behavior. A few studies have applied service design methods and tools to improve products and services in various types of libraries (for instance, Thamtheerasatian et al. 2018; Andrew et al. 2015; Juntunen et al. 2013; Marquez and Downey 2015; 2016). However, due to the holistic nature of this approach, none of these works has examined how service design approaches contribute to classification design in detail.

Service design is a user-oriented strategic and operational approach that integrates principles, practice and tools from various fields including design, organization, management and engineering. Aiming to facilitate the development of new services or service improvement, according to Stickdorn (2011), the approach can be characterized in five principles as follows:

1. User-centered approach: Actual user experience and perspective should be at the heart of the design.
2. Co-creative: The design process should involve various groups of stakeholders whose relationship and contribution are essential to the success of products and services.
3. Evidencing: While service experiences are considered as intangible, services should be designed from the perspective that they are tangible works that can be seen, touched or edited.
4. Sequencing: The design process should consider all stages in the service as sequential and connected as a whole.
5. Holistic thinking: The design process should consider all elements related to the service as opposed to those elements as parts of the service.

While there is no universal approach on the service design process, Katzen (2011) introduces three general phases in the implementation of a service design project: 1) inspiration, 2) ideation; and, 3) implementation.

The inspiration phase includes the formation of the design team and data collection to gather insights from various stakeholders. In this phase, the design team uses various design ethnography methods to develop empathy for service users and other stakeholders. Such methods include, for example, interviews, surveys, focus groups, observation, stakeholder map and persona. The insights gained from this phase may be pain points and potential areas for improvement as well as needs, requirements and obstacles from different perspectives.

The ideation phase involves finding various alternatives or solutions to the design problems. While creativity is highly encouraged in this phase, the ideation process should consider feasibility as well. Ideas that are feasible can be developed as prototypes and tested. In this phase, methods such as mind map, brainstorming, role play and storyboard can be used to generate ideas. After that, certain methods such as post-it voting or dot voting, idea affinity map and idea selection criteria can be used to select ideas that are feasible and impactful to be developed.

The implementation phase is concerned with how chosen ideas can be implemented. This phase relies heavily on practicality as well as integrating business, technology and socio-cultural understanding to deploy an actual service. Although, to a certain extent, each phase in services requires assessment activities, feedback from stakeholders is essential in this phase so as to lead to the next cycle of iterative design process.

2.3 Knowledge organization systems for central bank libraries

A central bank is distinct from any other types of financial institutions. It is a national institution overseeing monetary policy, money production and distribution and the financial stability of the entire country. Required by law, central banks in some countries also manage financial institution stability and payment system stability (Moenjak 2014; European Central Bank 2015; Segal 2020). The core functions of a central bank include governing, managing and monitoring activities that are related to national monetary and financial systems, for example, monetary and price stability, financial security, financial institution governance, payment system administration and currency issues (Plenderlieth 2009; Moenjak 2014).

The accountability of central bank operations requires a wealth of trustworthy information. Thus, the establishment of a library in a central bank is very common. While serving internal research needs, several central bank libraries also welcome external researchers and the public (e.g., Asian Development Bank 2020; Bank of Greece 2020).

The collections in central bank libraries are highly diverse depending on the concerns of the parent organization (Ebubechukwu and Udeh 2018). In organizing a wide variety of collections, particularly in economics, Petrova and Petrov (2017) surveyed the classifications used by libraries around the world. They concluded that there is no main classification system in this area. Most economic libraries utilize modern generic classification systems such as *LCC*, Universal Decimal Classification (UDC), *Dewey Decimal Classification* (*DDC*), Bliss Bibliographic Classification and BISAC Subject Headings Lists.

While generic classification systems have been widely used in bank libraries, the application of these systems in the domain of economics and finance can be limited (Field and Connell 2004). On an international scale, two major knowledge organization systems have been developed and tailored to the field of economics and finance: JEL Classification Codes and the World Bank (WBG) Thesaurus.

Developed in 1911, JEL was designed to classify articles in the American Economic Review, a journal published by the American Economic Association (AEA). The classification code was then managed by the editors of the Journal of Economic Literature (hence, JEL has been used as a common name). The JEL classification scheme has been used extensively in organizing various types of publication in other leading journals and online databases in the field (such as Econlit). Categorizing by topic, the JEL classification contains twenty main classes. Each class contains two subsequent subclass levels. Organized in a hierarchical manner, the JEL scheme uses a three-digit alphanumeric system. The first digit, using a letter, represents the main class. The two subsequent numerical digits represent two-level subclasses. An example of JEL codes is shown below.

Main class
E Macroeconomics and Monetary Economics
Sub – class level 1
E5 Monetary Policy, Central Banking and the Supply of Money and Credit
Sub – class level 2
E58 Central Banks and Their Policies

Another well-known knowledge organization system in the field of economics is the World Bank Thesaurus, developed and maintained by the World Bank Group (WBG). In contrast to JEL Classification Codes, the WBG Thesaurus compiles vocabularies based on the topical knowledge domains and areas of expertise of the World Bank. Also organized in a hierarchical pattern, the thesaurus contains twenty-five main entry terms (or so-called "concepts") representing various domains of knowledge ranging from, for instance, agriculture, education, law and justice, poverty reduction, information and communication technologies to urban development. Each entry term may contain sub-entry terms. For example, the concept "accrual basis" is a narrower term under the sub-entry "fiscal policy," which is under the main entry "macroeconomics and economic growth." In 2001, the Economic Information Network under the Thai National Information System in collaboration with the Economics Association of Thailand translated the World Bank Thesaurus Volume 1 Alphabetical list 1989 in order to assist the subject analysis and index process for librarians in economics libraries in Thailand (Economic Information Network Center 2001). It is noteworthy that the topic coverage of the WBG Thesaurus seems to be broader than JEL Classification Codes, due to the difference in nature of the work and the original purpose of the classifications.

While there are schemes and classification systems designed for the study of economic principles as well as the economic system as a whole, central banking has been designed as simply a subset of these systems. The business operation of central banks may have a distinct view of the economic system. A customized classification system designed for the business operation of central banks may be useful for not only the organization of bibliographic collection but also, perhaps, the document and record management of these organizations.

3.0 Design phases

We adopted the service design approach as a methodological framework to explore issues, opportunities and solutions for the relocation project. We consider a library from a holistic perspective as a service ecology (Marquez and Downey 2015). Therefore, the methods addressed in this section cover procedures conducted to obtain insights from various stakeholders and to ideate various alternatives to improve the BOT Learning Center's services as whole. However, this paper covers only the implementation and evaluation of the results of the classification design of bibliographic materials. Guided by the service design process, the study was divided into three phases: developing empathy, ideation of a new classification and implementation and evaluation. The subsections below include details about the methods and results of each phase.

In addition to the authors, the design team involved in this project included library administrators, library professionals, BOT staff and paraprofessionals from all relevant units. In each phase, the design members had different roles, for example, project design and management, data collection, ideation, data analysis, prototype development and testing and implementation and evaluation. During the pre-design phase, six major groups of target users were identified, including: 1) BOT executives, 2) BOT researchers and staff, 3) economic researchers outside of the BOT and graduate students in relevant fields of study, 4) undergraduate students in economics and other related fields, 5) other libraries in the same specialty; and, 6) the general public.

3.1 Phase I: developing empathy

3.1.1 Methods

To gain a deep understanding about the needs, experiences and problems regarding library services, space, technology and management from various points of view, the design

team employed two methods to collect data from various stakeholders including focus groups and in-depth interviews.

3.1.1.1 Focus group

Four focus group sessions were conducted during December 2013 to November 2015. The first session aimed to explore how experts in economics and library and information science envision the role of a learning center for economics research and financial literacy. In the second session, twelve BOT staff who visited the BOT Library frequently were recruited to share their experiences, issues, needs and expectations towards the ideation of a new learning center. The third session collected insights from fifteen BOT staff who were non-library users. The second and third sessions employed extreme user engagement strategies from the design thinking approach (Phillimore 2019) in the hope that the highly active users and non-users, with strong passion, emotions and behavior, would better articulate than other groups of users. The last session involving fifteen library staff was conducted in a workshop style where all participants were asked to conduct design tasks in small groups.

3.1.1.2 In-depth interviews

To obtain more details about different stakeholders' points of view, thirty individuals were asked to participate in an in-depth interview session. The participants included four BOT executive members, five BOT researchers, eleven researchers outside the BOT, two faculty members from economics and finance departments in leading universities in Thailand, four graduate students in economics from three universities in Bangkok and the vicinity, two students from a local secondary school and two residents in the neighborhood near to the BOT.

All interviews were conducted using a semi-structured protocol. The interview guides contained four major parts including the needs and expectations of :1) the BOT Learning Center's products and services, 2) topical interests and types of content and resources, 3) assistance provided by the library staff as well as the competency of library staff; and, 4) space design.

3.1.2 Results

The data from focus groups and in-depth interviews was analyzed using persona, journey map and empathy map. As a result, the developed personae covered various stakeholder groups including BOT executives, BOT researchers and staff, library staff, external economists and library users (i.e., graduate students, undergraduate students and neighboring community members). Each persona addressed basic demographic characteristics, personality, needs, frustrations, motivations, associated brands and preferred modes of communication. The journey maps portray the experiences that each persona encountered when finding and locating resources. Illustrating in stages, the journey maps include actions, thoughts and feelings and service touchpoints.

The design team also adopted an empathy map to encapsulate insights (i.e., needs and expectations) obtained from the focus groups and in-depth interviews. In summary, the participants representing all personae envisioned the BOT Library as a leading economic library of the country, serving as a meeting hub of Thai economists and bridging the gap between high-level economic knowledge and daily life situations. While potential users from outside the BOT would like easy and convenient access to the BOT collections and activities through various channels, the participants inside the organization (including executives, researchers, administrative staff and library staff) would like the library and its collections to enhance the image as well as to reflect the mission of the organization.

3.2 Phase II: ideation (conceptual design of BOT Classification)

3.2.1 Methods

Based on the insights gathered from the first phase, the design team developed strategic plans for the BOT Learning Center, including vision, mission, management approaches as well as products, services and the collection development plan. The ideation activity was also conducted during the last focus group session with fifteen library staff where the staff were divided into small groups brainstorming various ideas for products, services and activities relevant to their expertise and interests. As the BOT Learning Center also includes BOT museums, the financial literacy promotion department and archives, this paper only focuses on the ideas for the library.

As a result, the vision of the BOT Library is to become a comprehensive source for economic and financial research and education providing collections and services in economics, finance and central banking. Striving to become a leading information center in this area, the collection development policy was constructed based on three principles: the best collection (world-class and highly valuable materials), the first collection in Thailand (the most up-to-date materials) and a unique collection (distinctive and authoritative materials). The last principle responds to BOT executives' concerns on the efficiency of library acquisition as well as to showcase BOT unique collections (i.e., created and curated by the BOT or only accessible at the BOT). The topical coverage included five core subject areas including: 1) monetary policy: 2) financial markets: 3) financial

institutions: 4) payment systems; and, 5) financial literacy. These topics are aligned with the major mission of the organization.

Among numerous ideas that emerged during the ideation process, re-shelving the printed collection with a new classification system was one of the most supported ideas from the design team, supported by the results from insights obtained from the previous phase. Re-shelving could improve the findability of printed materials, particularly supporting BOT staff in collocating materials that are relevant to their tasks and duties. Additionally, it would help users from outside the BOT to learn about the role and responsibilities as well as the operations of central banks. An improved classification system that reflects the BOT mission and operations would enhance understanding of the BOT and, therefore, improve the image of the organization. It would also help to bridge the gaps between theoretical knowledge and operational knowledge. This aspect would also strengthen the new BOT core value (i.e., "offering hands, stand on the ground") in reaching out to the public. To design a conceptual framework of the new classification system, three major steps were conducted by the design team.

3.2.1.1 Mapping the BOT mission with JEL, *LCSH* and *LCC*

Since aligning with the BOT mission is one of the major motivations for redesigning the classification system, the core subject areas must also be in conformity with the organization structure. Therefore, the design team in charge of developing a classification system, additionally also invited two economists from each core business unit whose work directly corresponds with each core subject domain, including: 1) the Economic and Policy Department (administering monetary policy), 2) the Financial Markets Department (monitoring financial markets), 3) the Financial Institutions Policy Department (overseeing financial institutions), 4) the Payment Systems Policy Department (responsible for payment systems regulations); and, 5) the Financial Consumer Protection Department (promoting financial and economic literacy), to join the classification design task force.

Since JEL is considered to be the one of most comprehensive classification schemes in the area of economics and finance, the task force began to review the JEL classification system in terms of its applicability and compatibility with the new collection development policy. However, while JEL is applicable to most economists and scholars in the relevant fields, JEL may be too complicated and technical for the public and students who are also our target users. As a result, the task force decided to develop a new classification system, called BOT Classification, based on the main mission of the organization. The classification scheme contains the main classes, and two subclass levels, adopted from the JEL classification scheme. While the main classes rely on the BOT mission (i.e., monetary policy, financial institutions, financial markets, payment systems and financial and economic literacy), two additional main classes were added to support collections that are relevant to support users' general needs (self–improvement and leisure). Then vocabularies from other existing knowledge organization systems including JEL Classification Codes and *Library of Congress Subject Headings* (*LCSH*) were compiled to create subclasses and descriptions. Some terms are used directly, while some are grouped and renamed, as shown in Table 1, with the source of description terms designated in parentheses. In addition, the economists who had expertise in each domain also added new terms to represent the concepts that were missing or new (indicated as BOT in parentheses in Table 1).

Since the library used *LCC* in organizing its core collections prior to the relocation, the task force also compared the BOT Classification with *LCC*. The main objective of this process was to verify the comprehensiveness of the new classification as well as to validate the convergence and distinctiveness of all classes and subclasses in the new classification. Furthermore, it was to ensure the efficient transition to the new classification system in practice.

Main Class	**Subclass**	**Related Vocabularies**	**LCCN**
Monetary Policy	Monetary Policy and Central Banking	- Monetary policy (JEL, LCC, LCSH) - Unconventional Monetary policy (BOT)	HG 230.0 HG 451 - 1496
	-- Monetary Policy	- Foreign exchange rate (LCSH) - Foreign exchange (JEL, LCC) - Reserve requirement (BOT, LCC) - Capital Flow Measures (BOT, LCC) - Financial stability (BOT)	HG 3810 – 3877 HG 3810 – 3877 HG 3853.4 HG 3891 HB 3732

Table 1. An example of the BOT Classification scheme mapping with *LCC*, JEL, *LCSH*.

3.2.1.2 Designing notation

Since the classification is primarily developed for shelving management, notation plays an essential role in assisting users to browse and locate materials. Since there are only seven main classes, the notation uses abbreviations of the class description (i.e., MP for monetary policy, FI for financial institutions, FM for financial markets, PS for payment systems, FL for financial and economic literacy, IM for self-improvement and LS for leisure). Each subclass is denoted by a single-digit number, while zero represents a subclass without a subsequent subclass.

The subclasses (i.e., numbering system) are designed to represent the workflow of BOT business. The design team also considered how the ordering system would improve the collocation of materials to facilitate the browsing experience as well. Since the new classification primarily deals with the topical area, the second element in the notation is a geographical code which adopts LC Regions and Countries Cutter Table, where applicable, followed by a Cutter-Sanborn Three Figure Author Table. The last set of notation elements are publication year, volume number and copy number, respectively. For example, a book in subclass "central banks and their policies in Thailand" published in 2020 by the first author named Daniel would yield *MP12 T5.D184 2020* as a call number.

3.2.2 Results

The final classification includes seven main classes, thirty-seven level-one subclasses and twenty-two level-two subclasses. Note that four main classes (FM, FL, IM and LS) contain only level-one subclasses. MP contains five level-one subclasses, FI and FM has four each, PS has seven, FL has eight, IM has six and LS has three. The entire classification schedule is shown in Table 2:

Code	Main Class and Subclass
MP	Monetary Policy
MP10	Monetary Policy and Central Banking
MP11	Monetary Policy
MP12	Central Banks and Their Policies
MP20	Macroeconomics and Monetary Economics
MP21	Macroeconomic Factors
MP22	Prices, Business Fluctuations and Cycles
MP23	Money and Interest Rates
MP24	Macroeconomic Aspects of Public Finance and General Outlook
MP25	Forecasting and Simulation
MP30	International Economics
MP31	Economic Integration
MP32	International Trade
MP33	International Finance
MP34	Macroeconomic Aspects of International Trade and Finance
MP40	Economic Development and Innovation
MP50	Others
FI	Financial Institutions
FI10	Financial Institutions
FI11	Financial Services
FI12	Consumer Protection
FI20	Policy and Regulation
FI21	Risk Factor
FI22	Monitoring and Analysis
FI30	Supervision and Examination
FI31	Accounting
FI32	Supervisory Coordination
FI40	Financial Engineering
FM	Financial Markets
FM10	Financial Markets
FM20	Policy and Regulation
FM30	Capital Market
FM40	Foreign Exchange Market
PS	Payment Systems
PS10	Real-time Gross Settlement (RTGS)
PS20	Retail Payment Systems
PS21	Paper-Based Payment Systems
PS22	Electronic Payment
PS23	Payment Innovation
PS30	Clearing and Settlements
PS40	Risks in Payment Systems
PS50	Cross-Border and Cross-Currency Payments
PS60	Central Banks' Role in Payment and Settlement Systems

Code	Main Class and Subclass
PS70	Electronic Commerce
PS71	Electronic Data Interchange
PS72	Mobile Commerce
FL	Financial and Economic Literacy
FL10	Financial Planning
FL20	Income
FL30	Saving
FL40	Investment
FL50	Credit and Debt
FL60	Risk and Insurance
FL70	Consumer Rights
FL80	Economic Literacy
IM	Self - Improvement
IM10	Business
IM20	Computers
IM30	Science and Technology
IM40	Law and Society
IM50	Philosophy and Religion
LS	Leisure
LS10	Education
LS20	Life and Health
LS30	History and Travel
LS40	Recreation

Table 2. BOT Classification Schedule.

3.3 Phase III: implementation and evaluation

3.3.1 Methods

In this phase, the design team integrated the new BOT Classification into the upgraded collection service through various delivery channels including bibliographic records in the integrated library system (ILS), the online public access catalog (OPAC) interface, book spine label and shelving system. After the new classification system had been implemented for two years, the design team began to collect data from library users and staff to examine their experience of the new service.

3.3.1.1 Updating bibliographic metadata in the integrated library system

The BOT Library uses Aleph as the integrated library system. Additionally, the library also exchanges its bibliographic records via the OCLC connection platform. The BOT Classification is assigned as a local call number, MARC21 tag 099, preserving tag 050 for the original Library of Congress Classification Number (LCCN). Relevant JEL and *LCSH* terms based on assigned classes and subclasses are also inserted into each record using tag 999, local keywords.

The update of BOT Classification in bibliographic records was conducted in batches, in cooperation with the system administration team. In terms of updating call numbers in item-level metadata, the records were updated in batches by second-level subclasses, where applicable. This ensured the efficiency of the review process.

3.3.1.2 Redesign OPAC interface

The OPAC is the main portal for collection discovery as well as serving as a compass for users to locate desired materials, either with remote or onsite access. Without a well-designed OPAC interface, the new classification would not reach its maximum capacity in facilitating users. Therefore, the design team decided to redesign the OPAC using BOT Classification as an integral part of the entire system. In addition to displaying item-level call numbers, the new OPAC also allows users to browse and search for books by BOT Classification. The keywords embedded in tag 999 of each bibliographic record are also searchable. In addition, the classification is also integrated into the faceted navigation system of the OPAC. In addition to assisting access and discovery, the integration of BOT Classification aims to help users outside the BOT to be implicitly familiar with the business operations of the BOT.

3.3.1.3 Re-shelving materials

The relocation to a new building was an opportunity for the BOT Library to redesign its space to encourage the public to be interested in learning more about monetary economics and banking as well as to understand about the bank's mission. Physical shelves were strategically placed to facilitate the new classification. Based on insights from the first phase, the arrangement of materials using the new classification would also imitate the browsing experience at bookstores. Additionally, the classification also collocates materials in a way to promote serendipity in user discovery from shelf browsing. Prior to the actual implementation, a prototype of rearranging materials in two separate shelves according to the new classification was implemented and

tested at the previous site for two months. The objective of the prototype was to observe the feasibility of the idea as well as obtain feedback from library staff and users.

3.3.1.4 Redesigning spine labels

To help users to locate materials and assist the staff in shelving materials, the spine label was also redesigned using the new classification. The size of the spine label is 10.5 x 4.7 cm. With a white background, each main class is color coded (for instance, blue is used for MP class). The spine label contains five lines. The first line is the BOT Classification notation with a color code. The second line gives the main description of the main class. The third line is reserved for the geographical code, if any. The next line is for the author cutter table, while the last line is reserved for publication year, volume number and copy number.

3.3.1.5 Follow-up evaluation

To evaluate the impact of the redesign of the BOT Library, the design team has collected data about user experience as well as staff perceptions of the new classification. While the service design is an iterative process, the solicited feedback is primarily the responses to the first cycle of implementation. Since the goals of evaluation in the service design approach is to discover problems for further iterations rather than to obtain a summative picture of the experience, the approach relies heavily on qualitative data and methods rather than quantitative analysis. Thus, in this phase, we applied a qualitative in-depth interview technique to gather opinion from various stakeholders. Twenty-three participants were recruited using purposive sampling technique. With the provision that the participants were primarily chosen based on an extreme case approach, twenty-two participants represented highly active library users and potential users. The characteristics of the user group can be divided into four groups based on their role: ten BOT economists, four non-BOT economists, five BOT staff in non-economic roles and three regular public users. To address perspectives from the classification design team, a full-time professional cataloger who had been involved with the conceptual design and implementation process was additionally recruited for an in-depth interview. Nonetheless, the interview of the cataloguer focused on the challenges found during each process as well as concerns for future development and impact instead of usage experience. All interviews were conducted in May-August 2020. The data was analyzed based on the participants' roles using a thematic analysis approach.

3.3.2 Results

3.3.2.1 Collection statistics

The following section reports the comparison of collection distribution between using *Library of Congress Classification* and the new BOT Classification. Prior to the design process, the BOT Library, considered as a small special library, housed 39,098 printed materials. About 84% of the entire collection are classified under H (social sciences) class while the materials in other classes account for only 15% of the collection.

When taking a closer look at the distribution of materials in H class (32,932 materials), the majority of the collection (about 42%) are categorized in class HG (finance), followed by HF (commerce, 13.93%), HD (industries, land use, labor, 11.94%) and HJ (public finance, 10.19%). The proportion of the rest in H class accounts for 21.77%.

The distribution of materials by *LCC* is highly concentrated in one particular class, which affects the users' browsing experience and how they understand the classification scheme. Therefore, the design of BOT Classification also considered the proportions of materials in each class. Focusing on the main classes that correspond to the organization's mission, there are 30,523 bibliographic records for analysis. The distribution of the materials by BOT classification was as follows, also illustrated in Table 6. The main class MP (monetary policy) had 12,145 records (31.06%), followed by FI (financial institutions) with 6,650 records (17.01%), FL (financial and economic literacy) with 4,640 records (11.87%), PS (payment systems) with 3,952 records (10.11%) and FM (financial markets) with 3,136 records (8.02%). The proportion of the other two main classes (IM and LS) combined was approximately 30% of the total number of materials.

BOT Main Class	Records (%)
MP - Monetary Policy	12,145 (31.06)
FI - Financial Institutions	6,650 (17.01)
FM - Financial Markets	3,136 (8.02)
PS - Payment Systems	3,952 (10.11)
FL - Financial and Economic Literacy	4,640 (11.87)

Table 4. Proportion of library materials by main class of BOT Classification.

3.3.2.2 Feedback from follow-up evaluation

According to the responses from ten BOT economists, eight participants were generally satisfied with the new

BOT Classification, shelving arrangement, as well as the new OPAC interface. They felt that the integration with JEL classification system helped them to understand the collection better as well as to be efficient in the browsing and finding experience. In addition, they felt that they found what they looked for easily with the new OPAC interface, compared with the previous one. This was partially due to the additions of JEL descriptions into the search index. They felt that *LCC* class numbers were no longer necessary since they did not understand the notation, but the library might want to keep for in-house purposes. Nonetheless, two participants, who were familiar with the previous shelving arrangement based on the *LCC*, mentioned that it took them some time to get used to the new shelving system. After a short while, they felt more comfortable with the new system and found that the new classification led to a more comfortable experience. However, they still preferred *LCC* due to its familiarity. A detailed directory, providing all classification structures, was suggested by many participants in this group to assist the browsing and locating experience.

For non-BOT economists, the responses were similar to the majority of BOT economists. They felt that the new classification scheme allowed them to browse the shelves without any assistance from a librarian. The classification scheme helped them to understand the major mission (i.e., main classes). They still needed a directory demonstrating the complete structure of the classification scheme.

All five non-economic oriented BOT staff and three public users found that the new classification was helpful in terms of browsing experience. They also commented that it was understandable that the new classification scheme portrayed the mission of the bank. Specifically, the description of the main class on the spine label was very helpful. The new classification allowed the browsing experience to be less reliant on BOT staff. They felt more independent when browsing. Some participants mentioned that the browsing experience was similar to that which they had in bookstores which related to a pleasant and welcoming feeling. However, they still needed to understand the entire scheme and recommended a detailed directory of classification structure.

The interview of the head of the cataloging team focused on her experience in upgrading and processing materials. In her opinion, she felt that the new classification was strongly connected to the BOT mission. This might help users who are not familiar with the shelving arrangement based on *LCC*, which covers a wide range of topics rather than being specific to the needs and strategic plans of central banks. The new classification design, particularly the spine label design, also helped in outsourcing shelving staff who have no background in library and information science in locating materials. Nonetheless, she felt that the new classification was very sensitive to the organization's ever-changing political climate as it might be possible that BOT missions may be shifted or changed in the future. Re-shelving and updating bibliographic records can be costly and consume resources heavily. Therefore, frequent major updates might not be feasible. One of the possible solutions suggested was to realign only the main classes to match with the BOT mission while the subclass level and shelving arrangement should use *LCC* system.

4.0 Conclusion and discussion

We applied the design of classification schemes based on a work centered approach as well as the design of classification as communication. Using the service design approach as a methodological framework, this paper exemplifies the classification design at the BOT Library that facilitates wider user interests and behavior, organizational goals and work domains and the communicative function of classification.

During the major transformation of the knowledge units, the BOT Library was relocated and repositioned from an in-house library to a specialized public library serving both internal staff and the public. One of the major initiatives was to redesign the classification system of the book collection. Prior to relocation, the library used *LCC* to manage bookshelves. The library occasionally received feedback from users who could not locate the books they wanted. The system also did not induce the same experience they had with bookstores, particularly the browsing experience. This issue resonates with others' critiques of *LCC* regarding its limitation on browsability. (e.g., Shera 1966)

The new classification uses the mission of the organization as a main scheme for two reasons. First, users who are BOT executives and staff are familiar with the mission of the institution. Collocating books according to the operative mission would be compatible with BOT staff's mental model, allowing them to be able to browse books in a more effective way. Secondly, library users from outside the BOT can learn about how the central bank works by browsing the collections. A new classification would inspire outsiders to learn more about the central bank's operations.

The main classes were then mapped with the JEL classification to construct the detailed scheme. To facilitate the transition from the previous system, the new scheme was then mapped to the *LCC* scheme, including classes and subclasses. The detailed classification scheme included main classes, subclasses (two levels), geographical code, author cutter number, publication year, volume number and copy number.

Although this study is grounded in work centered design and classification as communication in which the classification can be developed from the analysis of work domains in juxtaposition to the intentional discourse to convey to the public, it is practically unavoidable not to recognize the cu-

mulative impact of mainstream classification schemes that have been used in libraries for decades. To address this challenge, the design team decided to integrate and maintain *LCC* in the design of the new BOT Classification. The mapping between mainstream classification schemes to specific contexts has been done previously in other classification design research. For instance, Olson and Ward (1997) undertook an initiative to map subject headings from the Women's thesaurus to class numbers in *DDC*. While the mapping between BOT missions, JEL and *LCC* may be challenging in terms of dealing with the discrepancy among the three schemes, similar to the discrepancy found in Olson's attempt (Olson 1998), the semantic structures derived from the organizational missions seems to be able to serve as a foundation context for JEL and *LCC*, without risking major harm to the semantics and structures of both standards.

Additionally, the library had to make numerous changes, including updating spine labels, updating metadata in the ILS, redesigning the OPAC interface and adjusting the book-shelving approach. As a part of the iterative approach of service design, the library has been observing and obtaining feedback on how the users have interacted with the system as well as the experience they have had while browsing the collection and locating material. As a result, the users, both with and without an economic background, have found the new classification helpful and easy to understand. While the cataloger indicated that the new classification is usable and useful, the classification that is subject to the organization mission may be vulnerable to the political climate and may need frequent updates. Since service design is an iterative process, the feedback would be an opportunity for the next iteration in the design process.

From a holistic perspective, classification can be an essential part of the user experience due to its communicative power (Feinberg 2008; 2011). At the same time, redesigning classification also involves revitalizing other related service elements, such as spine labels, space design, library website and OPAC interface and bibliographic metadata in the ILS. The redesign of classification at the BOT can be a case study where a holistic approach has been adopted. Even though the size of collection at the BOT Library is relatively small, the reclassification process reported here can be applicable to other special libraries.

The application of iterative design approaches such as service design can be a useful for the work centered design of classification schemes. While we have reported only the initial cycle of the design process, it is anticipated that the work domains including collaborative task situations and semantic structures will change over time (Albrechtsen and Pejtersen 2003, 215). The iterative design can support the dynamics of work domains in this regard.

As a pragmatic and critical approach, it is inevitable to observe potential bias emerging from the design of the new BOT Classification (Hjørland 2017; Bawker and Star 1999). The design process relies heavily on the assumption that the public lacks understanding about the central bank's mission and operations as well as financial literacy. Therefore, the "Financial and Economic Literacy" class was added to the classification scheme to facilitate collection dedicated to the public interest. However, such an assumption needs to be further evaluated since the actual public user characteristics and behaviors may deviate from what was originally planned.

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