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Signet of the Staatliche Bauhaus, created in 1922 by Oskar Schlemmer (1888-1943)

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International Journal of Multimedia Art, Design and Education

Prof. Siu-Tsen Shen

Editor-in-Chief

A warm welcome to the first edition of the International Journal of Multimedia Art, Design and Education (MADE), an open-access resource dedicated to publishing high quality, peer-reviewed research papers in all areas of design research. Since the early days of the Bauhaus movement in Germany (1919), the field of design has experienced rapid growth, and has now become a fully recognized academic discipline in its own right. However, the principles of unifying mass production with individual artistic vision, and combining aesthetics with everyday function remains as strong as ever 100 years on. During the last two decades, we have witnessed the phenomenal expansion of graduate design education globally. The importance of Design (in all its many forms) is now recognized throughout the world. As suggested by Friedman, et al. (2015), we need to reach a critical mass, we need a richer flow of knowledge, and we need a progressive interdisciplinary research program to support continuing growth of our field. In the UK, the Digital and Creative industries contributed £130bn and £101.5bn, respectively, to the economy, and there is excitement over the new area - known as 'Createch' - where these two industries interact. It has been suggested that there are four main growth opportunities where creative skills interact with artificial intelligence, mixed reality and other forms of technology. These opportunities are:

- immersive entertainment
- transformational experiences
- seamless service
- personalised tools

In addition to achieving the necessary critical mass of design researchers, we need open access publication venues so that new theories in design can be proposed, analysed, challenged, and confirmed or rejected. However, at present, not only do we not have a sufficient number of journals devoted to publishing design research, but often our access to these journals is restricted by subscription fees set by commercial publishers. Such constraints inhibit the healthy development of the emerging design discipline. The MADE Journal represents an effort to publish high-quality design research, and to disseminate this research to the widest possible audience. The journal places strong emphasis on quality and always will do.

Our Editorial Board consists of leading design researchers and practitioners from all over the world, all of whom have proved willing to contribute their valuable time to the development of this new journal. To reach the

widest possible audience, the journal will be published both online and in print. The online version will be open access, freely available for anyone, anywhere to download, read, distribute, and use, with proper attribution of authorship, for any non-commercial purpose. A printed version of the journal will also be available at cost. The journal aims to provide an international forum for exchange of ideas and findings from researchers across different cultures, by encouraging research on the impact of cultural factors on design theory and practice. The journal also seeks to promote the transfer of knowledge between professionals in academia and industry. To help make our vision a reality, we invite you to submit your best work to the MADE Journal and to encourage your colleagues to do the same. In these turbulent times, we all have a responsibility to use design tools to boost economic growth and provide opportunities to the younger generation. These are our future leaders, and together we can overcome the current challenges of Covid-19, recession and geo-political tensions in the world.

Acknowledgements

The first issue of MADE was only possible due to the hard work of the three contributors. Each of the contributors went through an extensive revision/review process, which resulted in works of excellent quality. The reviewers in the various disciplines spent countless hours on top of their already busy schedules to ensure the works included are of the highest quality. The MADE executive committee not only had the goal of creating this journal, but also served a large role in determining the initial format and general guidelines for the journal. They had online meetings to discuss deadlines, submission, and their careful consideration helped the editorial board avoid a number of pitfalls we could have encountered with this first issue. They were also charged with the difficult task of selecting the logo from an impressive set of submissions. I also need to acknowledge the work of Assisting managing editor, Sin-Yi Guan, who spent hours discussing policies, formatting, and any other number of other details about the journal with me.

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Prof. Siu-Tsen Shen

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Using Service Design and Innovation Operations in Digital Transformation

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Service design and its associated activities has established itself as an approach to deal with complex business challenges as organisations seek to innovate using new digital technologies. Service design as a methodology has become formalised and it plays a key role in the development of omni-channel customer-centric services as part of a digital transformation process.

As we shift from selling products (value-in-exchange) and services (value-in-use) and to outcomes (value-in-results) in a fast paced changing world of new technological innovation, the author of this paper has developed an agile approach to service design using a model that enables the identification of change candidates to drive growth, create value and improve operating efficiency, while simultaneously rethinking how businesses deliver improved experiences to customers.

The Four Quadrant Innovation Model can be used by teams involved in designing new services as part of a digital transformation strategy. The author has applied and developed The Four Quadrant Innovation Model as part of an approach to operationalizing innovation at scale in organisations in diverse sectors undertaking digital transformation.

Keywords **–** Service Design, Innovation, InnovationOps, ResearchOps, Agile, Digtial Transformation.

Relevance to Design Practice – This paper is concerned with operationalising innovation and using service design approaches and for businesses undertaking digital transformation in the product-service continuum.

Introduction

We are in an era of rapid change as we shift from selling products (value-in-exchange) and services (value-in-use) to outcomes (value-in-results). We have entered a new wave of business transformation driven by digitization, where the goal is to drive growth and improve operating efficiency, while simultaneously rethinking how businesses operate and how they engage and acquire customers. This transformation imperative, often referred to as digital transformation, is the result of three

interrelated forces - increased customer expectations, new competition, and new technology.

Rapidly changing customer expectations and behaviors have created challenges and opportunities for every business to more meaningfully engage with customers and anticipate their needs. Ongoing advances in technology are enabling new value proposition creation, often by connecting previously separate activities, such as marketing, sales, support, and supply chain management, while also continuing to streamline efficiency through the use of more open source technologies and more agile development methods.

The emergence of non-traditional competitors utilizing new bases of competition and asymmetrical approaches is threatening existing symmetrical incumbents and highlighting the need for an enterprise-wide rethink of how a business operates while underscoring an innovation imperative. This need for transformation through innovation comes at a time when many businesses have been challenged by operating in long term, low growth environments where investments in innovation have been starved of capital expenditure while operational expenditure is under pressure and where capital returns have been maximized by returning money to shareholders via stock repurchase or dividends.

There is a new business reality where very little feels familiar, traditional business models are being usurped and crisis management is the new norm. Companies today often face an existential threat in that the business model that they used to pursue and maintain competitive advantage. It is less durable than it used to be and as asymmetrical organisations are able to innovate with greater velocity, traditional symmetrical organisations are becoming laggards and losing market share.

Historically, most companies in an industry shared the same basic business model and the same core assumptions on the drivers of success and profitability (e.g. lower customer churn in telecommunications and faster product development cycles in automotive). These assumptions were typically not challenged, and the main focus of management was to optimize business activities in this context, often yielding steady but incremental improvements in performance. Digital is now at the core of the transformation opportunity as the market has graduated from digital extensions to needing the entire business to be a digital innovation native.

This historical paradigm has been broken as new entrants in the form of asymmetrical organisations have emerged that seem to play by a different set of rules. These new entrants challenge core business assumptions and introduce new business models, often fueling step change improvements in both growth and operating efficiency.

The nature of this changing business paradigm varies, but it often involves a shift from selling standalone products and supporting services via an “owned” infrastructure to delivering services-on-demand via an open ecosystem while embedding smart, connected products into those services. These organisations are fundamentally different by being data driven and highly agile enterprises, enabled by evolved business processes, adaptable cultural and organizational models, all supported by change sensitive technology architectures and more rapid development methods.

This paper will describe how holistic and asymmetrical approaches to innovation are successfully delivering digital transformation and that digital transformation is the path to creating a new business paradigm and ensure future success. Successful companies are using design thinking, lean approaches and agile principles to challenge core business assumptions by reinventing key business activities and their customer experiences thereby driving step change improvements in both growth and operating efficiency, while simultaneously moving the business to a more adaptable operating model.

Service Design - Systems Theory and Design Thinking

Digital transformation work typically begins with integrated strategy development and then moves rapidly to deploy solutions for maximum impact. Increasingly, strategy takes a holistic approach and is design led, moving quickly to deploy solutions for maximum impact while putting the customer experience at the centre of that strategy. The implementation of these solutions is supported by the ability to adopt and leverage the latest technologies, supported by a decentralised, asymmetrical leadership that supports an adaptive culture that can scale new capabilities to great effect to respond to new opportunities and changes in the marketplace.

Systems theory and design thinking both share a common orientation that is focused on delivering outcomes to complex problems that create impact and value. Systems theory promotes the definition and framing of complex problems that are separate from solutions and demonstrate an analytical bias. Design thinking demonstrates an action orientation and has a generative bias toward creative solutions that combines user, business and technological considerations.

Design thinking is used to develop empathy with users and to get an understanding of their needs and desires. Human Centred Design with a focus on user desires, needs and their experience is one part of the triumvirate of Design Thinking that have grown in importance and has been adopted by many different and diverse organisations across different sectors.

In the past, design has often occurred downstream in the development process and was concerned with aesthetics; the way things looked. Today, as business innovation expands to encompass human-centered design principles, complex and connected digital ecosystems, and organisational change and business transformation, companies are constantly seeking to identify value streams and understand user needs to create new products and services that are desirable, viable and feasible.

“Designers don’t try to search for a solution until they have determined the real problem, and even then, instead of solving that problem, they stop to consider a wide range of potential solutions. Only then will they finally converge upon their proposal. This process is called design thinking.” [1]Donald Norman, The Design of Everyday Things (2013)

Service Design - A holistic approach to digital transformation

Service Design, as an approach, attempts to take shared principles common to both systems theory and design thinking and apply them to complex challenges relating customer needs and behaviours, business processes, the use of

information technology systems and processing of data within the socio- organizational context of a business and marketplace.

Many of the world's most successful organisations in the outcome economy did not exist two decades ago, while some are less than ten years old. These native innovators can be referred to as 'asymmetrical disruptors' and often have first-mover advantage.[2] Asymmetrical disruptors do not use models rooted in expertise and silos typified by incumbents known as symmetrical organisations with centralised and highly hierarchical command and control leadership. Asymmetrical organizations use decentralised leadership models that provide a decision-making mandate to teams allowing them to respond quickly to change imperatives.

Successful digital transformation requires asymmetrical leadership with decentralised and distributed decision-making able to learn quickly and reconfigure activities that together define the core of a new digital enterprise.

Service Design first emerged as a way of dealing complex services in banking in the early 1980s and was pioneered by Lyn Shostack [3]. Service design is both a way of thinking and a set of practical and generative activities that can be used to improve or invent services. Service Design as a method is applied to create usable and impactful customer centric services while optimising a business or organisation's capabilities to deliver those services. [4, 5]

It is hard to separate the service from the technology that enables it, while digital technology provides a means to entirely rethink and create new value propositions and new business models. This has given consumers unprecedented convenience, choice and control and blurred the boundaries between products and services. At the same time ever increasing customer expectations pose a huge challenge for businesses.

Customer expectations now are set by the best digital experience from any industry. Companies have to conceive, design and deliver world-class, future-proof digital experiences at scale and speed but they have to do that in organisations that are encumbered with cultural and technological legacy.

Organisations create value for customers by addressing their expectations, in meeting their needs and delivering value. In return, value is captured in the form of commercial benefits; the money people are willing to spend. As we have shifted from selling tangible products to where a business offers value-in-exchange by providing intangible services, there is a shift to value-in-use. This demands new approaches to how we design for change.

The shift in value creation and capture cycle is determined by a huge range of interdependent factors. Service design as a set of approaches uses system theory and design thinking to identify, analyse and understand these interdependencies and to maximise their potential to generate value for both the customer and the business.

At its core, service design is the activity of planning and organizing people, infrastructure, communication and material components of a service in order to improve its quality and the interaction between the service provider and its users. Service design may function as a way to inform changes to an existing service or create a new service entirely.

Service Design takes a holistic, end-to-end, front-to-back approach to meeting customer expectations. An outstanding Customer Experience is necessary to meeting these expectations – but Service Design addresses more than just this 'Front Stage' Customer Experience

By necessity, it must consider and re-design the whole organisation; the 'Backstage' processes, operations, technology and supporting systems, required to deliver the service experience. Service Design is an approach that enables us to tackle highly complex business and organizational challenges to create user-centric and innovative solutions in the service-product continuum. Design has many different definitions, but at its heart it is about the process of translating ideas into reality, making abstract thoughts tangible and delivering value and benefits for users and the business.

Hypothesis Driven Design (HDD)

Design thinking is used to search for, and define, relevant problems and test assumptions. Using a hypothesis-driven strategy helps deal with uncertainty to identify unknowns and find solutions that are validated to be desirable, feasible and viable by using research, data, evaluative approaches to test our ideas and assess our assumptions.

Practicing hypothesis-driven design and development is about formulating and creating new ideas about how products and services can deliver value and benefits to end users by transforming the organisation to enable it to deliver new products and services and transformational change as a series of experiments to determine optimum solutions and outcome.

A hypothesis driven development (HDD) process is iterative and relentless. Using HDD we change our approach. We articulate user needs and view proposed solutions, based on a set of framed problem statements, as a hypothesis that can be tested and measured. We evaluate the hypotheses with users in the target market, against how a business model will work, how code will execute and how the customer will use it. We work iteratively to research, create insights, design, develop, test and evaluate our hypotheses.

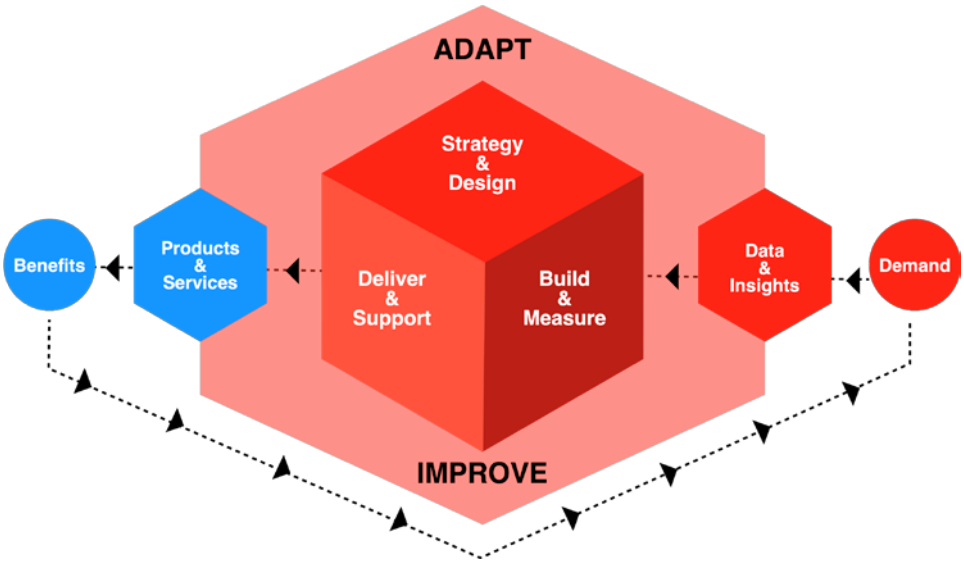

Figure 1. Improve and Adapt Model.

The key outcome of hypothesis driven design is an iterative and experimental approach that drives change and investment with measurable evidence and learning. Digital transformational change should be seen as a series of experiments to determine optimum solutions and outcome.

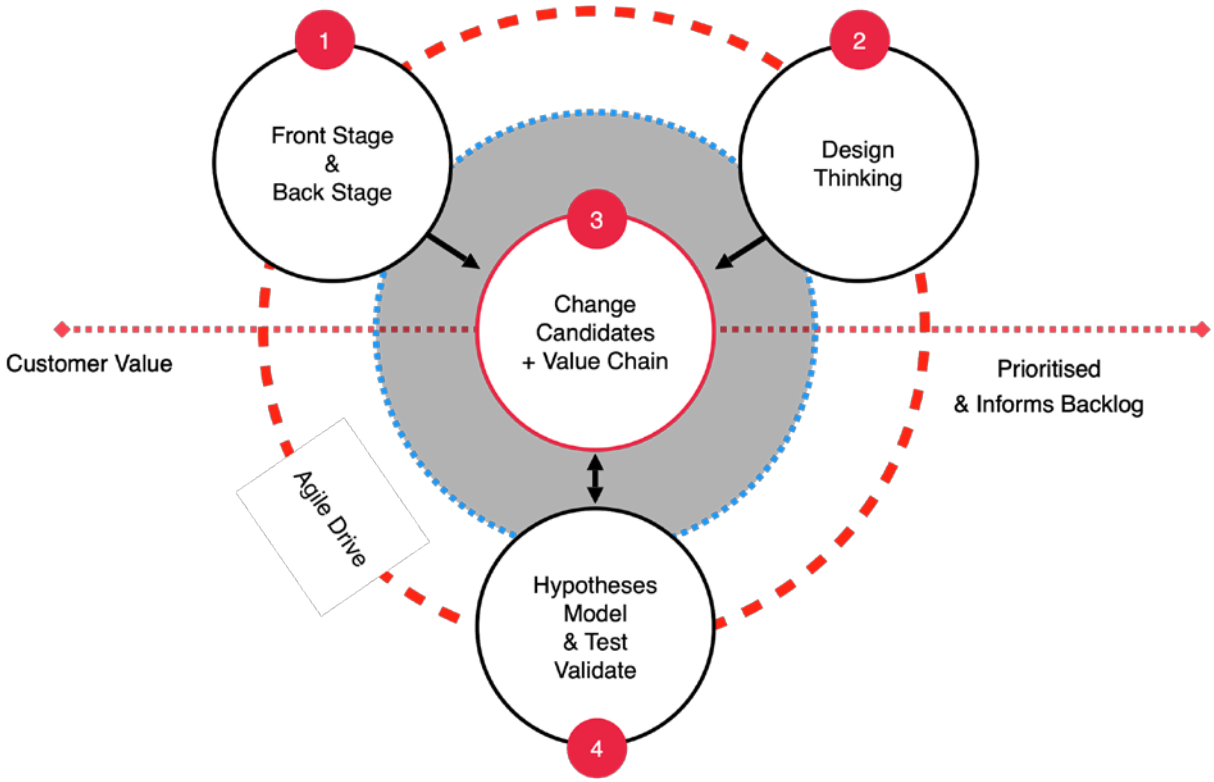

Figure 2. Hypothesis Driven Strategy and Design. (Source: Publicis Sapient (2018)) [6]

1. Frontstage & Backstage

Customer experience and engagement is shaped by frontstage experiences and backstage operations, processes and policies.

2. Design Thinking

Design Thinking is focused on understanding customer's needs and desires and viable business approaches using technology that is feasible. Design Thinking explores both present and future conditions by considering, users, the business and technology.

3. Change Candidates and Value Chain

Customer experience and engagement is shaped by frontstage experiences and backstage operations, processes and policies.

4. Hypotheses Modelling & Testing

Design Thinking supports the accelerated creation of solutions candidates. Modelling and testing is a mechanism by which those conditions are proved. Service Design is undertaken using an agile cadence to rapidly generate concepts, prototype, test to pivot or progress.

The Quadrant Innovation Model

The author of this paper has devised an approach to service design and innovation called the Four Quadrant Innovation Model that can be

used by teams involved in designing services and digital transformation. The Four Quadrant Innovation Model builds on the work of Larry Keely, as popularised in his book 'Ten Types of Innovation: The Discipline of Building Breakthroughs'. In this book Keeley et al, describe innovation principles that bring about meaningful and sustainable growth in an organization. Using a list of more than 2,000 successful innovations the authors applied a proprietary algorithm and determined ten meaningful groupings; the Ten Types of Innovation, that provided insight into innovation and how to operationalise innovation activities in the organisation. The Ten Types of Innovation explores these insights to diagnose patterns of innovation within industries, to identify innovation opportunities, and to evaluate how firms are performing against competitors. The framework has proven to be one of the most enduring and useful ways to think about transformation. [7]

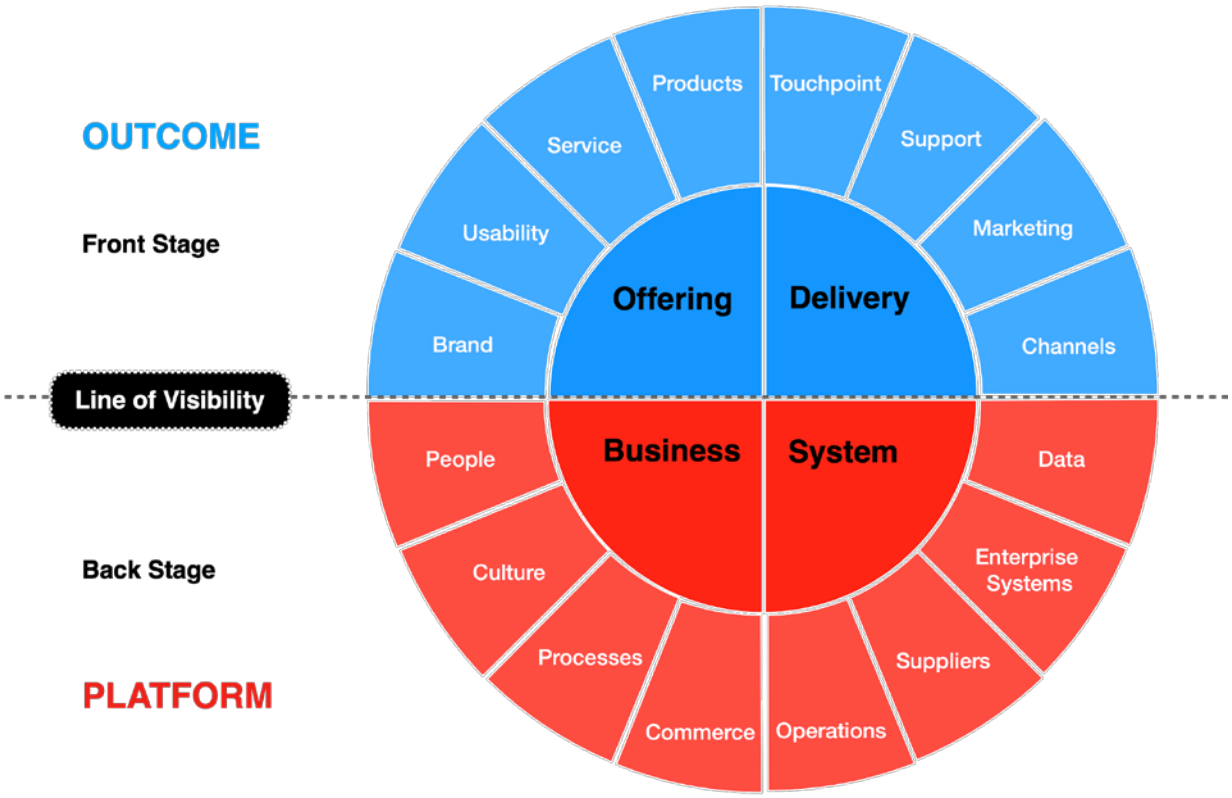

Figure 3. The Quadrant Innovation Model.

This model identifies four clusters of related innovation areas each with its own four domains that are the focus for innovation activities and where change candidates can be found and value created. The four quadrants consist of:

The Offering Quadrant

The Offering Quadrant is concerned with the value proposition to your customers. An offering is more than a product or service itself and includes elements that represent additional value to your customers, such as, usability, quality of service and the brand.

The Delivery Quadrant

The Delivery Quadrant is how an organisation delivers products and services to its

customers through touchpoints, support, marketing and the channels it uses to communicate and reach its customers.

The Business Quadrant

The Business Quadrant is concerned with people and organisational behaviours, the organisation's values and its culture. It is also concerned with the policies; rules that drive its activities, and the commercial mechanisms that are focused on the way the organisation generates income, incurs costs and makes profit.

The System Quadrant

The System Quadrant is concerned with the business operations, suppliers (their ability to add value and the relationship and arrangements with the organisation), IT systems and how the organisation collects, processes and uses data.

The top two quadrants are focused on the customer experience while the two lower quadrants are focused on the business as a platform. These two halves can be mapped to the stage model used in service blueprinting, an approach used in service design. [8]

Usability moves from customer focused to experience led by synching business models to customer journeys while capitalizing on the explosion of real-time customer data.

Products A digital product is any product you sell online that doesn't have physical form or substance.

Services moves the organisation away from individual products to service ecosystems by capitalizing on the rise of smart, connected systems. A service is an intangible experience, which arises from the output of one or more individuals. In most cases services are intangible.

Operations are business practices to create the highest level of efficiency possible within an organization. It is concerned with converting materials and labor into goods and services as efficiently as possible to maximize the profit of an organization. Operations are continually refined and enhanced while new approaches are explored.

Enterprise Systems are large-scale software packages that are able to track and control all of the complex operations of a business. These systems are used to help automate the business and make reporting and decision making easier. In the quadrant innovation model we are concerned with moving from industrial to multi-speed information technology systems, by applying agile development methods with a shift to open source solutions and born-in the cloud applications.

Suppliers are part of connected ecosystems where risk and reward is shared and there is a mutually rewarding relationship. Suppliers are contributors to the value chain that can be adapted quickly with minimal negative impact to take advantage of new opportunities and changing circumstances.

Data is like oil and its value lies in being able to collect, process and extract insight at speed. We are moving from retrospective analysis to real time processing by capitalizing on the explosion of customer and operational data along with the availability of advanced analytics and processing power to proactively act on that data to anticipate need.

Marketing has rapidly moved from from imprecise mass media to precise engagement and attributable outcomes using converged

media in the PESO model[9]. Attribution marketing capitalizes on the central role of digital, the explosion of real-time customer data and the emergence of new exchange models for media buying.

Channels offer different ways to engage with the customer using an omni-channel approach that enables the customer to engage in a way that suits them depending on their context and preferences.

Support provides knowledge about, and facilitates optimal use of, products and services ensuring accessibility and maximum benefit for the customer.

Operationalizing Innovation

The increasingly dominant role of agile approaches and the need to collaborate at speed to deliver products and services has precipitated the emergence of Innovation Operations (InnovationOps). InnovationOps is a way of systemising, codifying and operationalizing innovation. It is concerned with the mechanics of innovation; defines roles, team formation and adaption, ways of working and shared practices, efficient use of tools and using a set of approaches and activities in three distinct communities of practice - Research and its operations (ResearchOps), Design and its operations (DesignOps) and software development and its operations (DevOps).

While Service design and UX design offer a strategic and tactical vision, Innovation Ops provides the mechanics to enable teams, tribes and squads to work collaboratively using agile principles. It is the means by which an organisation can operate as an asymmetrical disruptor and to become an innovation native and so significantly reduce the time it takes to bring new products and innovative services to the marketplace.

Communities of practices from around disciplines and are a way to align efficient ways of working that are essential to scale capabilities to deliver change with velocity in an ‘agile’ environment. For example, large organisations use approaches like Scaled Agile Framework® (SAFe®)[10]. This requires people and teams to have specific skill-sets that enable them to learn, adapt and augment their capabilities in fast changing circumstances. Teams use and apply evidence based decision making in a dataful [11] environment and central to this approach is Innovation Ops. InnovationOps is concerned with the operationalisation of innovation including market and user research, business design, service design, experience design, user interaction design, as well as software and engineering development using highly iterative approaches and agile principles.

InnovationOps and Culture

Before Innovation Operations (InnovationOps) can be adopted it's important to form a cultural and behavioural mind-set that supports design thinking by having a focus on diverse and empowered teams with a learning mindset together with a focus on restless reinvention and radical collaboration through a design, build, test measure and learn model.

Diverse and Empowered Teams

Diverse teams generate more ideas than homogeneous ones, increasing the output of creating truly innovative and disruptive products or services. Empower the team with the expertise and authority to turn those ideas into

outcomes. Ensure teams are small and multi-disciplinary while encouraging trans-disciplinary skill-sets.

Outcome Focused

Users rely on products and services to get their tasks and goals fulfilled. Success isn't measured by the features and functions that are released, rather it's measured by how well the users' needs and goals are fulfilled.

Iterative

Everything is a prototype and another iteration. Teams are empowered to bring new thinking and new ways of delivering outcomes through a process of continuous improvement, iterating and improving using time boxing in sprints to deliver outcomes.

InnovationOps - Pillar Principles

The principles that underpin InnovationOps consist of the following pillars:

User Centricity - The designer is responsible for the user experience while the team is held accountable.

Agile - 'Pivot or Pursue' through a process of design, build, test and measure so as to learn as quickly as possible. Measure the impact of outcomes and kill anything that is not delivering user and business value. Change direction based on user feedback.

Automated - Use 'smart' software to do more by automating repetitive tasks while moving away from bespoke 'crafted' approaches to research, design and development.

Flow - a key to success is workflow and radical collaboration and speed to deliver velocity.

Connected Tools – We use tools in connected chains that can share outputs to support flow where outputs become inputs as they move through the tool chain.

Collaboration - It is important that expertise is shared and teams work collaboratively. Collaborative design practices and activities are supported using 'playbook' featuring a range of activities for co-creating in teams.

Outcome Focused - design, develop and drop then reflect and repeat as you scale to focus on outcomes.

Velocity - speed and direction is key. Using agile and sprints based be prepared to pivot.

Stories - these are the common and shared currency of agile teams and the organisation. Initiative, Epics and Stories can be used by all disciplines and tribes within an organisation.

Conclusion

The author of this paper has devised an approach to service design that is agile, that can be used as part of an operationalised approach to innovation. The Quadrant Innovation Model can be used by teams involved in designing new products and services as part of a digital transformation strategy.

The Quadrant Innovation Model provides the organisation with a way to identify high impact change candidates to unlock value, deliver customer benefits and disrupt a market place.

The author has developed and applied The Quadrant Innovation Model as part of an approach to operationalising innovation at scale

in organisations in diverse sectors undergoing digital transformation.

The framework has proven to be useful as a way to apply service design and deliver organisational transformation at scale to enable the organisation to become an innovation native that is capable of delivering new and disruptive products and services.

Endnotes

The author has been a teacher, practitioner and entrepreneur for well over three decades. During this time, working with many gifted individuals, he has honed his skill set and developed his own set of beliefs and models which have been proven to work in many different industries and fields of research.

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New Classification Scheme for Chinese Libraries - A localised classification scheme in Taiwan

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Apart from serving the pragmatic function of being a knowledge organization tool, library classification schemes are reflections of social construct and assumptions of the world. In Taiwan, the most commonly used system is New Classification Scheme for Chinese Libraries 2007 (NCSCL). It is a scheme tailored for Taiwanese libraries; carved to fit the region's unique political and cultural landscape. With supports from the local institutions and authority, NCSCL has the advantages of high uptake and interoperability for being a localised scheme, whilst it reveals evidences of how policy inflicted inherit biases on the scheme. This article set about exploring the scheme by outlining its historical context. It proceeded to describe and evaluate it in terms of arrangement by a comparative analysis with reference to Dewey Decimal Classification (DDC). Subsequently, the author identified the strengths and weaknesses observed. The article concluded that a transparent conceptual and philosophical foundation is necessary for an ethical classification system which caters end-users' needs.

Keywords – knowledge organisation, library classifications, Taiwanese library, ethics.

Importance – Libraries are generally perceived by the public as a place of trust. They often locate in the heart of education institutions. Nonetheless systematic biases permeate libraries through the way information is organised. This article addressed the importance of a neutral and inclusive classification system. One that is designed with ethics at heart.

Introduction

New Classification Scheme for Chinese Libraries 2007 (NCSCL 2007) [1] is the most commonly used classification scheme in Taiwan. It was firstly developed in 1929 based on Dewey Decimal Classification (DDC). Hence, it is a system bearing Western conceptualisation of knowledge organisation yet has a root in traditional Chinese bibliographic classification rules. This article aims to trace the historical context of NCSCL and have an overview of tool itself, unfolding how policy inflicts and rectifies bias of the scheme.

Due to the scarce literature in English language on NCSCL, it was a laborious task to find agreed English equivalents for Chinese terminologies. Moreover, not all subject headings have English translation listed in the schedule or in the relative index, whilst some

translations are less than accurate. Wherever it is possible, the closest existing terminologies from DDC are used in this article for the ease of readers' understanding.

History and context of NCSCL

"Seven Epitomes" and "Four Sections" classification[2] have been used as the major knowledge organisation framework in China for over two thousand years. However, due to the subject matters of Chinese books printed became more diverse, plus the increasing amount of foreign publications acquired by local libraries, the legacy systems became inadequate to accommodate the growing library collections towards the end of the 19th century. As a result, traditional methods were seen juxtaposing with new methods under the influence of Western and Japanese classification systems (Ng, 1980; Fu, 2015). As quoted by Cheng (1991), "The indigenous Chinese systems of Qi Lue (Seven Epitomes) and Si Bu (Four Sections) cannot be applied since scientific developments far exceeded their capabilities. Yet new classification had not made its appearance. Therefore, in this transitional period of time, there was a tendency for some libraries in China to replace the traditional Chinese classification with whatever Western classification they could lay their hands on".

Frederick Ng, former associate director at HK Baptist University Library, traced the development of Chinese classification systems (1980). He identified 1903-1923 as the breakthrough period that set forth the modernisation of classification schemes. The big turning point was brought about by the "Father of Library Science Education in China", Zhurong Shen[3] (1884-1977). Following his graduation from the New York Public Library School, Sheng published a 26-page "A System of Classification of Chinese Books Based on Dewey's Classification"《仿杜威書目十類法》in 1917, and subsequently the 2nd edition in 1922 with a "Relative Index" as an adjunct to the main schedule; aiming to unify the classification of Chinese books and foreign publications. It is the first modern classification scheme in China, and thereby accelerated the nationwide New Library Movement (Ng, 1980; Cheng, 2001).

Table 1. Main classes of "A System of Classification of Chinese Books Based on Dewey's Classification" by Zhurong Shen, published in 1917. This chart is recreated based on the descriptions by Ng (1980) and Liu (2010).

000	Classics & General 經部及類書
100	Philosophy & Religions 哲學及宗教
200	Sociology & Education 社會學及教育
300	Politics & Economics 政治及經濟
400	Medicine 醫學
500	Sciences 科學
600	Crafts 工藝
700	Arts 美術
800	Literature and Linguistics 文學及語言學
900	History 歷史

Despite the criticisms about this new scheme at the time, for instance 400 Medicine weightily occupies a main class on its own; Classics was marginalised and in 000 with General (Ng, 1980), it somehow signifies the foundation for the development of Librarianship in the 20th century China (Cheng, 2013). Furthermore, it was seen as the very model for adopting the principles of Dewey Decimal Classification (DDC), without blindly imitating the assignment of disciplines to individual classes (Liu, 2010). It exemplified localisation from a Western perspective with the contemporary Chinese scholarly trend in mind, not least Shen managed to partially incorporate "Four Sections" into the schedule. He had the vision of potential expansion on certain disciplines, and breakaway from the literary warrant limited to the collection in the Imperial Library (Liu, 2010; Lee, 2012). Prior to Shen's scheme, there were no enumerative classifications of the same sort, and traditional classifications such as seven Epitomes rendered mutual exclusivity irrelevant (Liu-Lengyel, 1987; Lee, 2012). Thereafter, no less than 10 versions of schemes modelled after DDC emerged, as the study of library science became fashionable in China (Cheng, 1991). Apart from DDC, Charles Cutter's Expansive Classification and Library of Congress Classification were also introduced to the library community in China during that period. However, unlike DDC which notations are entirely numerical, both LCC and Cutter's schemes contain English alphabets. Those foreign symbols were too novel for most Chinese, and thus were not as influential as DDC (Zhang, 2003).

Out of the dozen newly emerged classification schemes, one of which was Guojun Liu's (劉國鈞) "A System of Book Classification for Chinese Libraries" 《中國圖書分類法》, published in 1929 by University of Nanking Library[4]. Similar to Shen, with an American library school education background, Liu borrowed the principles of DDC and took elements from Four Sections for the new scheme, in order to allow classification of old Chinese books as well as new materials in other Asian languages, namely Japanese and Korean. It was re-edited with updates in 1936. Despite the use of Guojun Liu's classification system declined rapidly in Mainland China, following the creation of the communist People's Republic of China (PRC) in 1949, an adapted version of Liu's scheme is still actively used by the public libraries and some university libraries in Hong Kong (Pong & Cheung, 2006; Zhu, 2011; hkpl, 2014). Liu's scheme was revised by Yung-Hsiang Lai (賴永祥) in 1964 and renamed "New Classification Scheme for Chinese Libraries" (NCSCL) (the Chinese name remain unchanged), or simply Lai's Classification Scheme, which rooted and flourished in Taiwan.

New Classification Scheme for Chinese Libraries

Resembling to his antecedents, Lai obtained his MA in Library Science from an American library school. Lai's admirable devotion to modern Chinese library science is undebatable. Led by him, Liu's 1929 scheme went through eight revisions, starting from when he was a LIS professor at National Taiwan University (NTU), through 2001, 5 years after his retirement from being the Associate Director at Harvard-Yenching Library. Of which, five of them were minor modifications.

Nonetheless, he admitted in a biographical interview that the scheme needed to be

overhauled by a wider group of library and information professionals. Hence, he donated the copyright to the National Central Library (NCL) in Taiwan (Xu et al., 2007; Wu, 2017). The committee at NCL undertook 6 years to revise the 8th Revision of NCSCL and released the 9th revision in 2007 (will call it NCSCL 2007 below) with a new Chinese title[5] for the scheme (the English name remains unchanged) [6]. NCSCL 2007 was reprinted with updates in 2016. The discussions beneath is based on this recently reprinted version.

Arrangement of the scheme

NCL had put large amount of effort and resources on advocating the use of NCSCL 2007. One of the most pronounced evidence is the entire tool can be downloaded in the format of PDF files or Flipbooks from the NCL cataloguing website or CatWeb for short (URL: http://catweb.ncl.edu.tw) free of charge. In addition to the print publication and free downloadable files, there is also an online version available on *Standard for Chinese Subject Cataloguing Database* or CatBase (URL: http://catbase.ncl.edu.tw/App3/) (Figure 1). It is a convenient tool for looking up class numbers and subject terms albeit not as comprehensive as WebDewey.

Figure 1. User interface for 'Browsing' option of NCSCL online version. (http://catbase.ncl.edu.tw/App3/) [Accessed: 4th April, 2018].

The printed version of NCSCL 2007 comprises of two volumes: ***New Classification Scheme For Chinese Libraries Tables*** (will call it *NCSCL Tables* for short) and **List of Chinese Subject Terms**. As suggested by the title of the former, the 854-page contains various tables and schedules that made up the scheme. Although the latter volume is called *'List of Chinese Subject Terms'*, the function of it is comparable to the DDC Relative Index. Consists of 559 pages, 80% of it is a subject index with class numbers; sandwiched by introduction and reference tables. Since NCSCL is a principle-based classification scheme, *List of Chinese Subject Terms* helpfully display the reverse of topics arranged by the number of strokes of the leading Chinese character. This is a contrast to discipline-based scheme which provide a perspective for a topic to be classified. If we look at the arrangement of NCSCL 2007 as a whole, it is not dissimilar to an abridged version of DDC. Apart from having the shade of DDC, the NCL Director addressed in the preface that NCSCL 2007 has also taken references from the

Library of Congress Classification Scheme (NCSCL Tables, 2016, p. v).

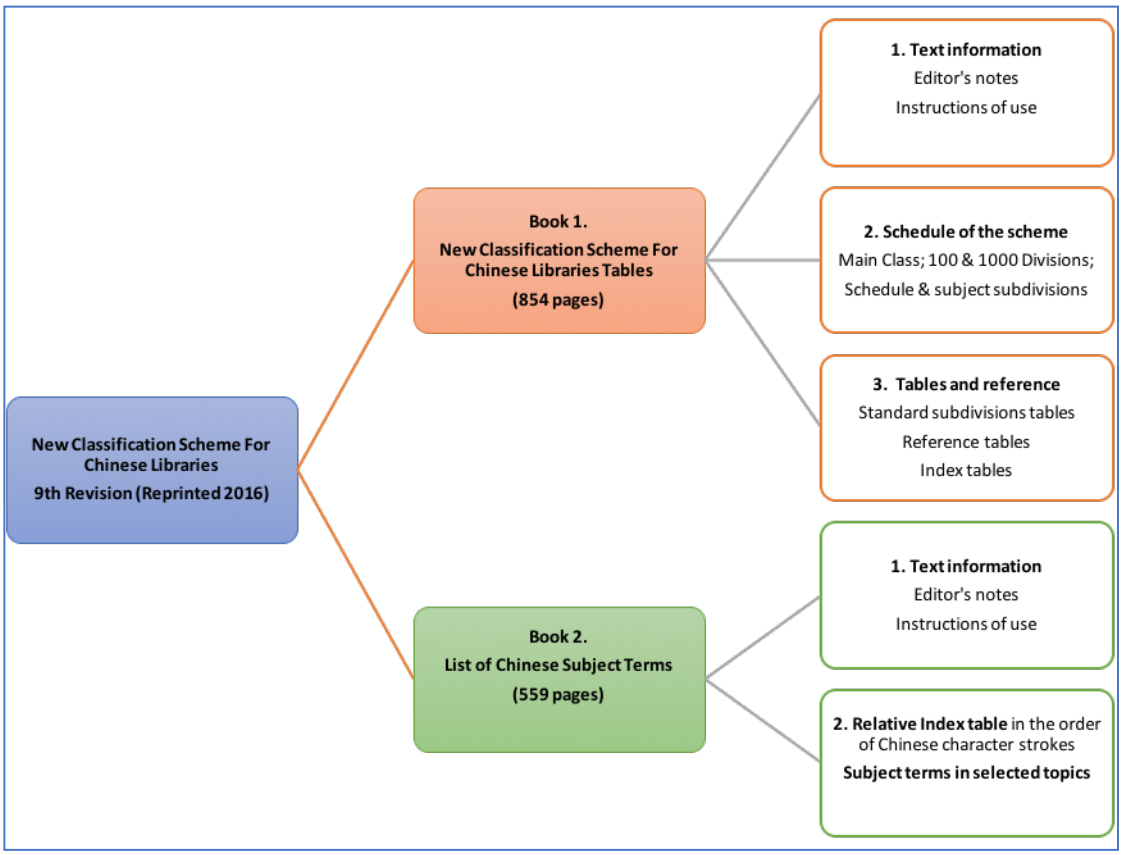

Figure 2. The arrangement of NCSCL (9th Edition, reprinted 2016).

Notation and number-building

As mentioned in the last section, just as DDC, NCSCL is an aspect classification system, of which all knowledge is divided into ten disciplines[7], numbered from 0-9 as main classes (Broughton, 2004). However, the conversion being that minimum three digitals are used in every class number (Satiji, 2007, p. 42), the main classes are often seen expressed as 000, 100, 200 and so forth. Below table (Table 2) lists the main classes of NCSCL 2007 and DDC:

Table 2. Main classes and headings of NCSCL 2007 and DDC 23.

Main Class Numbers	NCSCL 2007	DDC 23rd Edition
000	Generalities & Chinese Classics	Computer science, information & general works
100	Philosophy & Psychology	Philosophy & psychology
200	Religion	Religion
300	Sciences	Social sciences
400	Applied sciences & Commerce	Language
500	Social sciences	Science
600	History and Geography of China	Technology
700	World History and Geography	Arts & recreation
800	Linguistics and Literature	Literature
900	Arts	History & geography

The main classes are subdivided into nine divisions. Including the main classes, there are 100 class divisions at this level, hence the name "*The Hundreds Division Table*" in DDC, and a more generic name "*Outline of the classification tables*" [8] in NCSCL 2007. Each of these hundred classes are then further subdivided into nine sections and form the "*Table of the 1000 sections*". After that, any sub- sub-divisions are preceded with a decimal point. The decimal point was commented as a 'semantically hollow" convention to break up a number for mnemonic reason (Satiji, 2007, p. 41). According to NCL (2016), NCSCL 2007 contains approximately 30,000 entries of class numbers with headings in the schedule. Class number can be built further by using the Standard Subdivision Tables or Subject Division Tables locating within the schedule to characterise specific topics. For a more precise shelfing location, there is an *Author's Number* added to the end, to form a *Call Number*. The Author's number is usually a 4-digit number for a 3-syllable Chinese name, or a 3-digit number for a 2-syllable name (the maximum is 4 digit); the first number denotes publishing time period e.g. ***8*** means the book was published after1912 (The year Republic of China was created). NCL had devised a set of rules to tackle multiple authors, multiple editions and other complications that a classifier might encounter (NCL, 2002; Lu, 2017). The following is an example on how a call number was constructed for a Chinese book with class number + subdivision number + author's number:

Su, G.X. (2017) *British Fiction and Romanticism: Conflict, Compromise and Packaging*, Peking University Press: Beijing.
Call number 873.27 8879[9]

Class number

873 English Literature

.2 Literary critics

7 Fiction (follow subdivision table of 812 General Literary & Criticism as per note against 873.2)

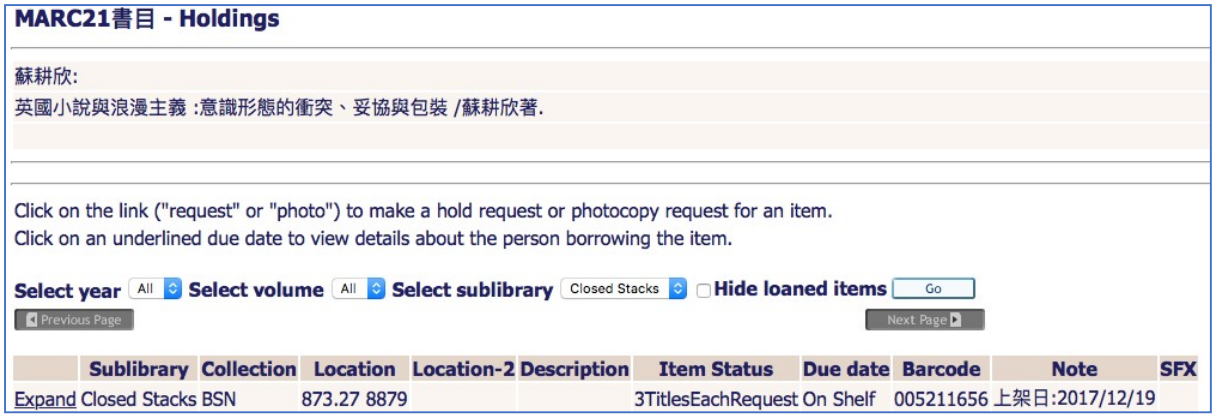

Figure 3. Screen shot of NCL catalogue MARC21 record display of the book, Su, G.X. (2017) British Fiction and Romanticism: Conflict, Compromise and Packaging, Peking University Press: Beijing. Call number 873.278879.

As showing in Figure 3, on the NCL MACR21 record database, the call number is

listed under "Location", which affirms our previous mentioning that an important function of classification – to provide a precise location for retrieving a physical book on the shelf. One benefit of this type of hierarchical classification system is that the books are numbered relative to each other (Bowman, 2005, p.2), and therefore they are placed together in a supposing logically way.

Associative relationship notes

A feature of aspect or principle-based classification is that subjects can be found in more than one place in the scheme, depends on the treatment to a given subject (Bowman, 2005). Below is an example on the subject *Statistics*. From the 100s divisions, we can see *510 Statistics* comes under the discipline *500 Social Sciences*. However, as search on CatBase, there is a note about class number 51 as highlighted in the below screenshot (Figure 4).

Translation of the notes on class 51:

"Statistics is relating to the aggregation of quantifiable data. Books dealing with the principles and methods of statistics, as well as the general statistical publications associated with a country or region are ***class-here***. It is advisable to classify all kinds of specialised statistics under its individual subject, with the exception of *Statistics of population* (515), *Vital statistics* (516), and *Statistics of national income* (517). For example, *Mathematical statistics* is classed as 319.5."

Figure 4. Screenshot of class number 51x on CatBase.

The above note on class number 51 is self-explanatory enough to illustrate that a subject can be approached from multiple aspects or disciplines. In this case, the subject *Statistics* can be realised from the Social Science or Mathematics point of view. At the same time, the notes also help to introduce two characteristics of NCSCL directly 'borrowed' from DDC: scattered notes such as "class-here"（入此）and hierarchy force. According to the instructions in

NCSCL Tables, there are four types of notes that give relational annotations between classes and to provide information on the scope of a specific class (NCSCL, 2016, p. viii). They are "Class here" (入此), "Include into" (入), "Recommended class" (宜入), "See also" (參見).

入此 /Rù cǐ/ indicates the classification of narrower or more subtle topics, but sometimes also refers to the classification of broader topics or new topics (NCSCL, 2016, p. viii). This is close to the explanation of 'Class-here note' in DDC[10]. In the *Statistics* example above, "books dealing with the principles and methods of statistics" and "the general statistical publications associated with a country or region" are narrower terms of statistics under the discipline of Social Sciences. Due to the hierarchical nature of the scheme, notes of a class number also apply to all the subdivisions downwards and hence called 'Hierarchy force' (Bowman, 2005). Therefore, the note is against class 51, but it is applicable to all classes from 510-519 and any subdivisions further down.

"Include into"（入 / Rù/) a verb literally means 'enter into'. This note indicates that a subject is affiliated to a specific discipline. However, taking into consideration of certain situation or particular reasons, instead of classifying the subject to its affiliated discipline, it is more appropriate to class elsewhere. Therefore, this note takes the opposite direction of "Class-here note" and somehow display resemblance to the *Class Elsewhere* note in DDC (Satija, 2007). For example, the note against *306.8 Science museum* states "General discussion about Museum 'include into' 069; *Museum of natural history* 'include into' *300.9″*. It annotates that it is better to class the topic "General discussion about Museum" and "Museum of natural history" elsewhere, though they are relating terms to "*Science museum*" (NCSCL Tables, 2016, p. 128).

The 3rd one is "宜入"(/yí rù/) and is the most confusing type of notes, which I hereby use a literary translation "*Recommended class*" for this kind of note. According to the instructions (2016, p. xviii), in order to meet the needs of different professional fields, some topics with complex subjects are assigned to two class numbers with different upward notational hierarchies. In other words, "*Recommended class*" deals with topics with two associated subjects by providing an alternative classification number, while specifies a preferred, or "official" class number. To illustrate, in Figure 4 scenario 1, *[374.36] Paleobotany* has a note underneath stating *"Recommended class 359.4 Paleobotany; Fossil plants"*, which means *[374.36]* is an "unofficial class number", and *359.4* is the "official" one. Meanwhile, in scenario 2, the entire *367.[83] Aquatic Environment* subdivision is recommended to be classified under *366.9 Hydrographic*. From how it appears, this kind of note resembles *deprecation notes* in DDC, especially with the use of square brackets. However, "*Recommended class*" note does not stipulate the forsaking of a class number, but offer an alternative option, albeit some *Recommended class* notes are clearly the result of class relocation. For example, *[677] Taiwanese history* and *[678] District history of Taiwan* have been relocated to *733* in NCSCL 2007. However, in order to avoid the costly reclassification process, NCL has chosen to retain the old class number as an un-official option (Wu, 2008).

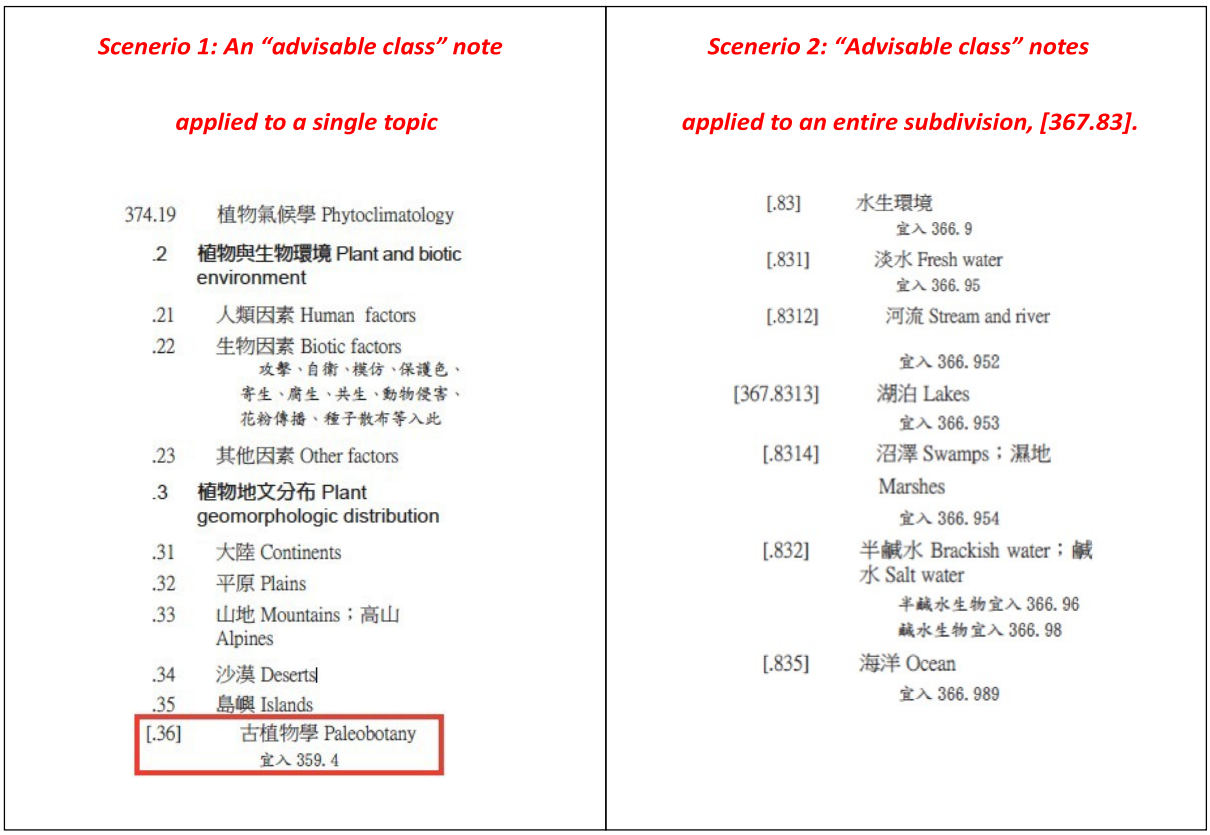

Figure 5. On the left shows a single subdivision (p.199) with "Recommended class" note underneath, while the example on the right shows that the entire topic [367.83] Aquatic environment should be officially classed under366.9 Hydrographic instead (NCSCL Tables p. 192-193).

The final type of note is "See also" (參見 /Cān jiàn/). Same as in DDC, "See also" notes lead to classes that are tangentially related to the topic and therefore might be confused with it (OCLC, 2017). It serves as reminder to classifiers also consider these potentially confusing subjects, then assign a most appropriate class number to the documents (NCL, 2016, p. xix).

Strength of the NCSCL 2007

A highly localised scheme

Nothing suggests that NCSCL is an innovative classification scheme, but its most obvious strength lies in the fact that it is a Taiwan-Centric system from the outset, as Lai modified Liu's "A system for Classification in Chinese library" based on the collection at National Taiwan University Library in 1964. To refine the "Taiwanese" offerings has been a main focus for the NCSCL 2007 revision committee, in particularly on the below four subjects: "Taiwan History", "Taiwanese Biography", "Taiwanese indigenous languages", and "Taiwanese Literature" (Wu, 2008). It is a scheme tailored for Taiwanese libraries and a representation reflecting Taiwan's unique political and cultural environment. The objective was fulfilled by updates on the subdivision sections and tables of the geographical names in Taiwan, historical time periods, and Taiwanese literature division, not only for the main stream languages, but also taking into account the minority indigenous tribal groups or Austronesian (NCL, 2007b). Historically, this group of Taiwanese residents

were undermined by the policy makers. For example, the term "Plains Indigenes" was used prior to 1994 to refer to a conglomerate of more than 10 ethnic groups. The existence of these individual tribes was not recognised by the Taiwanese government and assimilated into one (Vickers, 2008, p.87; Huang & Liu, 2016). It had casted an oppressive shadow over the self-identity of these ethnic groups, which deemed hugely unethical. The same discriminatory term was mirrored in the previous revisions of NCSCL. There were no subdivision entries on those ethnic groups. Owing to the efforts from international linguists and anthropologists (Huang & Liu, 2016; Diamond, 2000), studies on Taiwanese indigenous culture and languages is rejuvenating. For example, Taiwan's Indigenous Peoples Resource Center was set up in 2005, under the realm of National Taiwan University Library, to promote the understanding and study about Taiwan's Indigenes (Council of Indigenous Peoples, 2010). A change in policies to embrace the "colourful Taiwanese multiculturalism" after 2000 has also been observed (Vickers, 2008, p.87). This is somehow echoed in NCSCL 2007, nine ethnic tribes were newly assigned with class numbers in the *Taiwanese Ethnography* section (*536.33*). Given classification system is a reflection of social construct and assumptions of the world (2009, Mai), NCSCL 2007 is an ensuing effort to preserve and revive the nearly extinct indigenous culture. Below chart is an extract of the newly added headings and class numbers on Taiwanese related subjects and topics in NCSCL 2007:

Table 3. An extract of the newly added headings and class numbers on Taiwanese related subjects and topics in NCSCL 2007).

New Subjects/topics headings in NCSCL 2007	Class numbers	New Subjects/topics headings in NCSCL 2007	Class numbers
Origin (Taiwanese indigenes ethnography)	536.3301	Taiwanese literature	863
Movement	536.3303	Taiwanese literature history	863.09
Dutch & Spanish occupation (1624-1661)	536.3304	Literary theory	863.1
Ming Dynasty 1661-1683	536.3305	Literary criticism	863.2
Qing Dynasty 1683-1895	536.3306	General collections	863.3
Japanese occupation 1895-1945	536.3307	Individual author's works	863.4
Republic of China (1945 onwards)	536.3308	Various Taiwanese literatures	863.5
Distribution of ethnic tribes	536.3309	Taiwanese poetry	863.51
Ketagalan (Plains indigenes tribe)	536.3391	Taiwanese drama	863.54
Luilang (Plains indigenes tribe)	536.3392	Taiwanese prose	863.55
Kebalan (Plains indigenes tribe)	536.3393	Taiwanese novel	863.57
Taokas (Plains indigenes tribe)	536.3394	Taiwanese folk literature	863.58
Papora (Plains indigenes tribe)	536.3395	Taiwanese children literature	863.59
Pazeh (Plains indigenes tribe)	536.3396	Taiwanese Hakka Literature	863.7
Babusaga (Plains indigenes tribe)	536.3397	Taiwanese aboriginal literature	863.8
Hoanya (Plains indigenes tribe)	536.3398	Taiwanese Local literature	863.9
Siraya (Plains indigenes tribe)	536.3399		

Easy to understand and use

Like DDC, with pure numerical notation, it is certainly an advantage for NCSCL, for it contains both intellectual hierarchy and subdivision capability (Satija, 2007, p. 40). The scheme allows for the close topic classification - lengthy class numbers for more specific characteristics or broad subject classification - shorter class number. Besides, since NCSCL is modelled after DDC, much of the rules for notation, number building and terminologies are identical between the two schemes, which means if a classifier is familiar with one scheme, she can understand the basics of other one easily. This is especially beneficial when a library uses NCSCL to classify Chinese, Japanese and Korean books, and uses DDC for Western language books. (Lu, 2017).

Support from NCL

Another strength of the scheme lies in the resources and support offered by NCL to promote the use of NCSCL 2007, especially within the first few years of launching. Apart from the free disseminations of the tool, CatWeb provides a platform for NCL to train and for the end-users to learn the new scheme. The resources range from slides on how to create Author's number, citation order to Question and Answer section. Figure 6 is an extract of a translated transcript of the Q&A section[11], showcasing the way NCL is supporting NCSCL users.

As showing in the transcript (Figure 6), the NCL have built an array of databases which contain a wealth of information on classification and metadata for cataloguing. In addition, on all new books published in Taiwan, there is a suggested class number readily printed on the colophon (Figure 7). Suggested class number is one of the fields that a publisher required to fill in when apply for an ISBN (International Standard Book Number) and CIP (Cataloging in Publication) in Taiwan[12]. This is not only a time saver for library workers, but also ring-fencing the kind of scheme to be used nationwide to enhance interoperability. With a highly localised standard scheme and supports from the Taiwanese authorities, NCSCL renders a high usage in Taiwanese libraries. Moreover, propelled by the recruitment system that those who wish to work in public libraries have to pass a civil service examination (Lin, 1998, p. 147), which syllabus include NCSCL 2007[13]. In 2010, the scheme is used in all public and institutional libraries in Taiwan and 80% of other libraries (including older revisions) (Zhu, 2010).

Question:

I am a member of teaching staff in a secondary school and also in charge of the school library. Our school is relatively remote and small. The library collection has not been catalogued. I reckoned it is time to start cataloguing it gradually. If I follow the cataloguing rules and classification scheme of some bigger school, would it be too complicated? But if I start the cataloguing process myself, I do not want my future successor to have the need to do it again.

I am not sure where I should start. We have a copy of "New Classification Scheme for Chinese Libraries" at hand, but what else should I focus on first? Fortunately, the library collection is not too big with only about 10,000 items. Hope I can have your valuable professional advice. Thank you.

Answer:

First of all, I would like to salute you for taking on the job and benefit the students. You should first consider whether there is a library management software or not. Below are the suggestions:

1. Have a library management system

It would more appropriate to copy/import the descriptive cataloguing data, instead of cataloguing the books from scratch. The bibliographic metadata can be retrieved from the below database:

- NCL ISBNNet Database,
- NCL Catalogue MARC21 Database,
- Synergy of Metadata Resources in Taiwan (SMRT)
- National Bibliographic Network

As long as there are no typos, you can use the data right away without further editing. If I remember correctly, the Ministry of Education had developed a system for primary and secondary school libraries recently. Maybe you should inquire into it.

2. No library management system

Create a simple query system (such as a EXCEL spreadsheet), you can copy the data from the above sources or create a simple chart with ISBN number, title, author, publisher, call number (for shelfing), upload it to a blog, or onto Google Book.

If it is your first attempt, you will surely encounter many problems, which cannot be clarified in a short email.

Figure 6. Transcript of a cataloguing inquiry on NCL CatWeb Q&A (June 2016)

Figure 7. NCSCL 2007 Class number are printed as imprint in books published in Taiwan. [Murakami, H. (2017), translated by Lai, M.-Z. Taipei, China Times Publishing.]

Weaknesses

Scattering of related subjects

NCSCL and DDC were conceived prior to an era with ubiquitous information technologies. Enumerative classification is problematic when dealing with rapidly changing field since the revisions are not catching up with technological development (Bawden & Robinson, 2014) and being discipline-based, subjects are scattered as discussed previously. Class numbers and headings relates to computer technology can helps to exemplify this kind of problem.

With a quick search on WebDewey (DDC 23), while the subjects relating to computer technology do scatter, majority are classed in neighbouring divisions – *004 Computer sciences, 005 Computer programming, programs, data, security and 006 Special computer methods*. The rest are under *621.39 Computer engineering* and across other disciplines' related computer application. Whereas in NCSCL 2007, computer science (software technology) is under *312* and most computer hardware relating topics are under *471.5 computer manufacturing*. We can see how closely *312* and *471.5* are related by looking at sections *312.111* and *471.511*. Both of them are on the same topic, *Digital Super Computer*, albeit under different disciplines. It takes a classifier's experience on subject analysis and judgement assign the most appropriate class number to a document. Admittedly, NCSCL 2007 has much improvements comparing to its previous revisions by relocating computer science from 312.9 to 312 (Chen, 1999). Still, having a fast expanding subject cluttering in two class division or section while required to be exhaustively representing all knowledge (Zins & Santos, 2011), means some books have long call numbers or have to be shoehorned into a more general class, not to mention the shelf distance for software and hardware books. Below is a snippet of computer related class numbers of NCSCL 2007:

Table 4. A snippet of computer related class numbers of NCSCL 2007.

Class number	Headings	Class number	Headings
300	Science	400	Applied Science
310	Mathematics	410	Manufacturing
312	Computer Science	417.5	Computer manufacturing
312.1	Computer; Data processing	471.51	Various computer types
312.2	Programming design	471.52	System analysis and design
312.3	Programming languages	471.53	Operations; maintanence; repairing
312.4	Computer application and computer program	471.54	Computer circuits
312.5	System programming designn and system program	471.55	Storage
312.6	Micro-programming and micro-program	471.56	Computer interface and communication device
312.7	Computer system data related processing	471.57	Peripheral facilities
312.8	Programming uses special algorithm; Multimedia	471.58	Other computer equipment
312.9	Chinese data processing; Chinese computer		

Other weakness

DDC is described to be 'unduly prescriptive" and have too many rules (Bowman, 2005, p.6). Despite NCSCL 2007 is relatively simpler, it is indeed in a similar situation as DDC. If a user does not read the instructions and notes carefully, it can cause a lot of confusions, given the relational notes themselves are confusing enough. This is especially true on the "*Recommended Class*" notes when obsolete or relocated numbers still showing as alternative, which can be seen as a frequently asked question on CatWeb. There are other examples on confusing areas can be quoted, but the quintessential one has to be the two different ways of subdividing Chinese historical time periods (Subdivision Table 2 and 3, NCSCL 2007, p. 695-698), which have been criticised by a number of authors (Chang, 2012; Lu, 2017; Chen, 2012).

Another shortcoming is that NCSCL 2007 does not have regular updates like DDC23. According to the posts of updates on CatWeb, the last updates took place on 20th February 2017, and the ones prior to that was on 11st August, 2016[14]. This might be due to the fact that a lot of resources of NCL have been shifted to develop Chinese RDA. It can be observed from the amount on workshops announced and training resources concerning Chinese RDA.

Finally, the flip side of a highly localised scheme inclining to classify materials of a specific region is that it hampers the possibilities to be used by other communities, even the target materials to be classified are in the same language. NCL have developed a version for Hong Kong and Macau libraries, with additional subdivision section on HK and Macau related topics. However, browsing through the public and institutional library websites of HK and Macau, I have not seen any of them taking up NCSCL 2007. Though it could have potential to be used by smaller libraries, given the freely downloadable and online tools.

Conclusion

A classification scheme is more than a tool for knowledge classification. It does not only govern the way in which knowledge is made accessible, it is a reflection of cultural, societal and political changes; not least NCSCL is a 'national' scheme used by a relatively tight group of audience, defined by geographical and language boundaries. Albeit bearing a Western conception, it is also rooted in traditional Chinese classification frameworks. The role has developed from serving as a tool for "distinguishing true knowledge from false" and indexing a limited collection within the imperial circle, to one for providing a means for documentation and information and

retrieval (Lin, 1998, p. 146). However, as commented by Hjørland (2008) on DDC, which is also relevant to NCSCL, the scheme was founded from the classifier's point of view, rather than catering the support to users of libraries. It reflects a worldview of the authorities, displaying historical contingency of discourses of order, power and control (Rafferty, 2001), which can be instantiated by the classification entries related to Taiwanese Indigenous Tribes. Mai (2010) reminded us that the users of knowledge organisation scheme have embraced the fact that classification systems are inherently biased.

Libraries are generally perceived by the public as a place of trust. Libraries are often locating in the heart of education intuitions. They are pivotal in upholding the neutrality and inclusivity of education. Yet systematic biases permeate through the way how information is organised A reliable classification system is not merely lying in its usability, but also building on a transparent conceptual and philosophical foundation. One that recognises the ethics by design principal.

This essay was first submitted in 2018 in partial fulfillment of the requirements for the degree of Master of Science (Library Sciences) in City, University of London. The author currently works as a Finance and Research Officer in University College London.

Endnotes

There are various versions of acronym for New Classification Scheme for Chinese Libraries in literature. It was called CCL, CLC, NCSCL. In order not to be confused with The Chinese Library Classification (CLC) used in People's Republic of China, NCSCL is used throughout this essay for New Classification Scheme for Chinese Libraries.

Seven Epitomes (七略 Qī lüè) was effectively a catalogue of the imperial library collection developed between 26 and 6 B.C. It consists of seven volumes with (1) the first devoted to outline the 6 main classes as follow, (2) six arts/classics; (3) philosophy, politics, and law by the masters; (4) lyrics and rhapsodies; (5) military texts; (6) science and occultism; (7) medicine, treatment and formulae. (Liu-Lengyel, 1987; Lee, 2012). Four Sections emerged during Jin Dynasty (A.D. 265-317) under the title of "New Classics Bibliography" and categorised books into the following main classes: (1) Classics; (2) History (3) Master scholars' work on philosophy, law, medicine, etc; (4) literature and music (Liu-Lengyel, 1987). Four Sections method was influential throughout the history of classifying Chinese manuscript and rare books. The evidence can be seen from the famous "Sì kù quán shū" (四庫全書), which I would translate as "A complete catalogue of the four imperial library sections", compiled between 1772 to 1782 AD by the Qing Government officially, which the exact four divisions from the original "New Classics Bibliography" were used (Liu-Lengyel, 1987; Wang, 2011). The "Siku Quanshu" Wikipedia page provides a brief overview in English: https://en.wikipedia.org/wiki/Siku_Quanshu.

Zhurong Shen (沈祖榮) is also known as Samuel T. Y. Seng in the US. His name was transcribed as Zurong Shen n scholarly articles published in Mainland China with Standard Romanisation annotations.

Nanking is known as Nanjing nowadays.

The former Chinese name of NCSCL, "中國圖書分類法" /zhōng guó tú shū fēn lèi fǎ/, was inherited from Liu's 1929 scheme which literally means "Book classification system of China". Whereas in the 9th edition, "中文圖書分類法" /zhōng wén tú shū fēn lèi fǎ/ means "Chinese books classification system". The new name has shed the geographical denotation of the scheme, but focus on the language of materials to be classified, i.e. Chinese.

Please see Appendix 1 for the list of revisions published.

Taiwanese scholar, Chang (2012) considered 600 History and Geography (China) and 700 History and Geography (World) as one discipline. Therefore, instead

of 10 disciplines, there are 9 disciplines in NCSCL.

See Appendix 2 for NCSCL 2007 “Outline of the classification tables”.

Taiwan National Central Library, MARC21 Database: http://aleweb.ncl.edu.tw/F/NET8KJSK8CLK94BQLB3FQ6HM1P1RFA8GJTVDNUGR5QG6Q1FEBN-08332?func=item-global&doc_library=TOP02&doc_number=004241467&year=&volume=&sub_library=BS [accessed 1st May, 2018]

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Source: Webpage “How to Apply for ISBN” URL: http://isbn.ncl.edu.tw/NCL_ISBNNet.eng [accessed 8th May, 2018].

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Appendix

Appendix 1. List of the revision years for the Classification scheme for Chinese Libraries

Year	Chief Editor	English Name	Chinese Name
1929	Guojun Liu	A System of Book Classification for Chinese Libraries	中國圖書分類法
1964	Yung-Hsiang Lai	New classification Scheme for Chinese Libraries	中國圖書分類法 – 新訂初版
1971	Yung-Hsiang Lai	New Classification Scheme for Chinese Libraries (2nd Revision)	中國圖書分類法 – 新訂二版
1973	Yung-Hsiang Lai	New Classification Scheme for Chinese Libraries (3rd Revision)	中國圖書分類法 – 新訂三版
1976	Yung-Hsiang Lai	New Classification Scheme for Chinese Libraries (4th Revision)	中國圖書分類法 – 新訂四版
1977	Yung-Hsiang Lai	New Classification Scheme for Chinese Libraries (5th Revision)	中國圖書分類法 – 新訂五版
1981	Yung-Hsiang Lai	New Classification Scheme for Chinese Libraries (6th Revision)	中國圖書分類法 – 新訂六版
1989	Yung-Hsiang Lai	New Classification Scheme for Chinese Libraries (7th Revision)	中國圖書分類法 – 新訂七版
2001	Yung-Hsiang Lai	New Classification Scheme for Chinese Libraries (8th Revision)	中國圖書分類法 – 新訂八版
2007	NCL (Taiwan)	New Classification Scheme for Chinese Libraries (9th Revision, Reprinted 2016 with updates)	中文圖書分類法

List of the revision years for the Classification scheme for Chinese Libraries.
Source: this table is compiled based on the biographical interview of Yung-Hsiang John (Xu et al., 2007).

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Appendix 2: Outline of NCSCL 2007 (The Hundreds Division)

簡　表
Outline of the Classification Tables

總　類		**Generalities**
000	特藏	Special collections
010	目錄學；文獻學	Bibliography；Literacy（Documentation）
020	圖書資訊學；檔案學	Library and information science；Archive management
030	國學	Sinology
040	普通類書；普通百科全書	General encyclopedia
050	連續性出版品；期刊	Serial publications；Periodicals
060	普通會社；博物館學	General organization；Museology
070	普通論叢	General collected essays
080	普通叢書	General series
090	群經	Collected Chinese classics
哲學類		**Philosophy**
100	哲學總論	Philosoply：general
110	思想；學術	Thought；Learning
120	中國哲學	Chinese philosophy
130	東方哲學	Oriental philosophy
140	西洋哲學	Western philosophy
150	邏輯學	Logic
160	形上學	Metaphysics
170	心理學	Psychology
180	美學	Esthetics
190	倫理學	Ethics
宗教類		**Religion**
200	宗教總論	Religion：general
210	宗教學	Science of religion
220	佛教	Buddhism

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230	道教	Taoism
240	基督教	Christianity
250	伊斯蘭教	Islam（Mohammedanism）
260	猶太教	Judaism
270	其他宗教	Other religions
280	神話	Mythology
290	術數；迷信	Astrology；Superstition

科學類 Sciences

300	科學總論	Sciences：general
310	數學	Mathematics
320	天文學	Astronomy
330	物理學	Physics
340	化學	Chemistry
350	地球科學；地質學	Earth science；Geology
360	生物科學	Biological science
370	植物學	Botany
380	動物學	Zoology
390	人類學	Anthropology

應用科學類 Applied sciences

400	應用科學總論	Applied sciences：general
410	醫藥	Medical sciences
420	家政	Home economics
430	農業	Agriculture
440	工程	Engineering
450	礦冶	Mining and metallurgy
460	化學工程	Chemical engineering
470	製造	Manufacture
480	商業：各種營業	Commerce：various business
490	商業：經營學	Commerce：administration and management

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社會科學類		Social sciences
500	社會科學總論	Social sciences：general
510	統計	Statistics
520	教育	Education
530	禮俗	Rite and custom
540	社會學	Sociology
550	經濟	Economy
560	財政	Finance
570	政治	Political science
580	法律	Law；Jurisprudence
590	軍事	Military science
史地類		History and geography
600	史地總論	History and geography：general
中國史地		History and geography of China
610	中國通史	General history of China
620	中國斷代史	Chinese history by period
630	中國文化史	History of Chinese civilization
640	中國外交史	Diplomatic history of China
650	中國史料	Historical sources
660	中國地理	Geography of China
670	中國地方志	Local history
680	中國地理類志	Topicla topography
690	中國遊記	Chinese travels
世界史地		World history and geography
710	世界史地	World：general history and geography
720	海洋志	Oceans and seas
730	亞洲史地	Asia history and geography
740	歐洲史地	Europe history and geography
750	美洲史地	Americas history and geography
760	非洲史地	Africa history and geography

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770	大洋洲史地	Oceania history and geography
780	傳記	Biography
790	文物考古	Antiquities & archaeology

語言文學類 Linguistics and literature

800	語言學總論	Linguistics：general
810	文學總論	Literature：general
820	中國文學	Chinese literature
830	中國文學總集	Chinese literature：general collections
840	中國文學別集	Chinese literature：indivisual works
850	中國各種文學	Various Chinese literature
860	東方文學	Oriental literature
870	西洋文學	Western literature
880	其他各國文學	Other countries literatures
890	新聞學	Journalism

藝術類 Arts

900	藝術總論	Arts：general
910	音樂	Music
920	建築藝術	Architecture
930	雕塑	Sculpture
940	繪畫；書法	Drawing & painting；Calligraphy
950	攝影；電腦藝術	Photography ；Computer art
960	應用美術	Decorative arts
970	技藝	Arts and crafts
980	戲劇	Theatre
990	遊藝及休閒活動	Recreation and leisure

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User Studies and Design Process of Universal Signs System for Orientation in Yunlin County

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This paper proposed a visual sign system for residents of Yunlin County in Taiwan. There were three previous user studies linked to the sign system with a literature review related to the study. Each study outlined the problem of the study and suggested findings to the design of the new system of signs. The signs were designed based on the other researcher's study's findings and results of user studies described in the paper. The list of services needed signs were taken from one of the previous user studies, it included 21 services. There were 26 signs proposed in the first draft version. These draft signs were evaluated via a survey among Yunlin county residents. Most of the signs did not achieve 67% acceptance rates. The study outlined the problems in not accepted signs. Based on the evaluation results, signs were divided into three groups according to the acceptance rates from the survey. Modifications were proposed to the signs which had less than a 67% percent acceptance rate. Besides, possible implementation of the signs was presented. For further work, more user studies and real sign implementations were suggested to achieve more effective visual communication.

Keywords **–** Globalization, Cross-Cultural Research, Universal Design, Design Research, Cross-Cultural design, Semiotics, Sign perception, Sign design, Visual recognition.

Relevance to Design Practice **–** This study has value when designing visual communication for localized regions, with international residents. The sign development process as described can be used by other researchers. The evaluation results are valuable for defining effective design solutions in sign creation.

Introduction

Under the globalization and internalization processes, Taiwan is becoming more multicultural and an attractive spot for people from all over the world. According to the Tourism Bureau, M.O.T.C. The Republic of China(Taiwan), there are millions of tourists and hundreds of thousands of foreign residents who come to live in Taiwan. The number of international residents in Yunlin county was twenty-one thousand residents in 2019. () Most

of the foreign people prefer bigger cities; nevertheless, according to Yunlin government's official web page, the area of an industrial park in Yunlin County is 16.54 hectares that covers one-third of the total industrial area in Taiwan in 2007.

These days, local businesses and services are not adapted for people from other cultures who travel and live in Yunlin county. However, most of, non-Chinese speaking residents find it hard to live a "full life" in Yunlin county and have successful orientation experience without Google translate or online maps. It is significant to take into consideration that Taiwan uses Mandarin which is a pictorial language, meanwhile, the western world uses the alphabetic system. It changes the conception and principles of imparting the meanings of signs. Besides, most of the signs and designs used by local people were based on the Chinese culture metaphors and conceptions, not to mention meanings of colours, the direction of reading, historical background, culture. Similarly, the western world based on the main globalization influencers cultures: American and European.

There is a danger of a loss of cultural identity and tradition under universalisation and standardisation. Yunlin county is mainly an agricultural region where people kept traditions, an authentic atmosphere of old times. It is a great place to find interesting spots, nature, local people and real Taiwan in some way.

The primary goal of the sign development should be to support people in their orientation who experience various challenges following their contextual environment and background. These signs present the try to build a universal sign system for more effective communication between local business, residents and tourists.

The goal addressed in this study is to establish connection localized and global culture affect the recognition of signs by people from various cultures. It helps improve orientation for all residents of Yunlin County. The goal is to create a universal design set of signs that preserves local traditions and specifics for local and foreign residents of Yunlin County. Thus, the research aims to analyze factors and phenomena that are easily recognized by humans and to make this system satisfactory for all users in a cross-cultural cultural society.

Literature review

Globalization

Globalization has accelerated since the 19th century due to advances in transportation and communication technologies. This growth in global interaction has sparked an increase in the international exchange of concepts and culture. Globalization is mainly an economic process of integration with social and cultural aspects. Globalization process makes services and products spread around the world. Globalization is a historical phenomenon that opens up new capacities for communication and interaction between people of various cultures. (Scherer, B. 2010) To illustrate, under globalization shops and restaurants such as McDonald’s, Starbucks, Zara and Cosco integrate almost in every country in the world.

Globalization has affected many areas, but it can be defined as the acceleration of economic growth and cultural ties operating around the world. (O'Sullivan, T., Hartley, J., Saunders, D., Montgomery, M., & Fiske, J., 1994)

In 1967, Marshall McLuhan described the phenomenon "the global village" which turned

into “the dominant term for expressing a global coexistence altered by transnational commerce, migration, and culture”. (Poll, R. (2012) Based on the concept of "sender" and "receiver", media such as television, personal computers and the Internet further expand our senses to a global scale (McLuhan, 1994). However, this sender/receiver society is based on a one-way system in which the sender imposes his global message, ignoring its context and secondary interactions.

The world is changing and even small traditional places like Yunlin county become a "the global village". "Somehow, globalization is destroying the diversity of local culture and denies or ignores its identity… society is becoming increasingly multicultural and is trying to adopt the Western trend in its way, some nations are fully aware of it, while others are trying to accept only a part of the phenomena from other cultures." (Ominina, M., & Shen, S. T. 2019).

Localization

The idea is to get to know the culture, language and behavior of customers in a specific target market so that the product is integrated into the local market. Bert Esselink used the definition of LISA (The Localization Industry Standards Association) in his book. “Localization involves more than just producing the service or product easily available in the language and specifics of a target market. It must communicate with the target audience, based on its cultural uniqueness and their way to see a world.” (Esselink, B., 2000)

Another determination of the localization from the LISA used by Anthony Pym: “Localization involves making a product linguistically and culturally appropriate for its target audience and the place of its realisation.” (Pym, A., 2005)

The success in achieving a 'culturally appropriate' product means not only translation, it includes visual appearance which is essential for creating a localized product. Translations cannot replace localisation, it may be a part of the localization process.

Internalisation

Internalization is one of the fastest and most common ways to adapt a service or product for a cross-cultural society. There are many ambiguous opinions about this approach for integrating products or services in localized cultures. Esselink used a definition from the Localization Industry Standards Association (LISA): “Internationalisation is the process of generalizing a product so that it can handle multiple languages and cultural conventions without the need for redesign. Internationalization takes place at the level of program design and document development.” (Esselink, B., 2000).

Usually, this approach includes a translation to the most common languages such as English. Whereas English lags behind in the number of native speakers, it is by far the world's most commonly studied language. Overall, more people learn English than French, Spanish, Italian, Japanese, German and Chinese combined. (Noack, R., & Gamio, L., 2015) This variety of commonly learned languages listed by Noack and Gamio demonstrates that internalization is not a very efficient way and sometimes needs a translation into many languages. Translations in many languages are not easy to do without significant changes in

design.

Semiotics

Semiotics is an area of scientific research the activities, forms, behaviour or other processes related to signs which include the production of meaning. A sign is anything that transmits meaning. “Signs allow people to recognize patterns in things; they act as predictive guides or plans for taking actions; they serve as exemplars of specific kinds of phenomena, and the list could go on and on.” (Chandler, D., 2007)

A Cambridge dictionary definition of 'semiotics' is: “the study of signs and symbols, what they mean, and how they are used”. Fernande de Saussure wrote that signs include two components: a signifier (an object) and a signified, (the conceptual and cultural meanings generated by the signifier).

Semiotic researcher Charles Sanders Peirce divided signs into three types: an icon; an index; and a symbol. He argued that a sign can never have a definite meaning because the meaning must be determined.

“Semantic distance is a measure of the closeness of the relationship between what is depicted in an icon and the function it is intended to represent.” (Ng, A. W., & Chan, A. H., 2008) It is one of the essential criteria in the sign creation process and evaluation.

Culture

Definition of culture is a complex of factors such as language, social norms, beliefs represented in conscious and unconscious behaviour. These factors are transmitted from an older to a younger generation in families as well as through educational institutions. Besides that, “culture” is associated with art practices such as music, fine art, literature. Cambridge Dictionary defines culture as 'the way of life, especially the general customs and beliefs, of a particular group of people at a particular time'.

Kluckhohn defined culture as determined ways of thinking, feeling and reacting, mainly transmitted by signs, constituting the distinctive goals of human groups, including their embodiments in artefacts; the essential core of culture consists of traditional (i.e., historically derived and selected) ideas and especially their attached values. (Kluckhohn, C., 1951)

“Culture” became a measurable factor with the help of Geert Hofstede in the 19th century. Hofstede developed cultural dimensions during his research in IBM. Hofstede's work is unique as he offers a scale by which cultural value can be assigned to a specific group of people. This group is defined by a geographic boundary. (Straub, D., Loch, K., Evaristo, R., Karahanna, E., & Srite, M., 2002).

Universal design

The Center for Universal Design at North Carolina State University explains universal design as “the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design” (Connell et al., 1997) The main concept of a universal design does not aim only for a minority of the population, a design must be universal. “Make things adjustable, and you will find that more people can use it, and even people who liked it before may now like it better.” (Norman, D., 2013)

There are seven main principles of Universal design defined by the Center for Universal Design at North Carolina State

University:

- Principle 1: Equitable Use
- Principle 2: Flexibility in Use
- Principle 3: Simple and Intuitive Use
- Principle 4: Perceptible Information
- Principle 5: Tolerance for Error
- Principle 6: Low Physical Effort
- Principle 7: Size and Space for Approach and Use

All of these principals should be taken into consideration for creating a universal design product. Besides, it is important to evaluate universality during the design process. "Choosing the most appropriate design solution requires an understanding of and negotiation among inevitable tradeoffs in accessibility and usability. This demands a commitment to soliciting user input throughout the design process." (Story, M.F., 2001)

Cognitive psychology and Perception

It is important to understand the principles of cognitive psychology and perception to be aware of the results of design. Cognitive psychology and perception is an area of study related to visual and audio recognition of objects. It researches how the brain processes information. Perceptual information guides our decisions, affects people's unconscious and shapes our beliefs. Our knowledge impacts the way we comprehend the world around. (Raftopoulos, A., 2011)

The other definition of these phenomena from Tacca is the following: "to the extent that perception and cognition seem to share information, it seems there is no sharp division between the realm of cognitive abilities and that of perceptual abilities." (Tacca, M.C., 2011)

Basic understanding of cognitive psychology and perception is significant for the current study. The design of the sign system requires knowing how the brain works and people recognize and percept the objects.

Conclusion of the literature review

In summary, to gain a more complete understanding of sign design, one must have a knowledgeable comprehension of globalization, localization, internalization and culture. With the knowledge gained from these areas of research, one will have a better grasp of semiotics, perception and recognition in the cross-cultural society. Besides, while current opinions of signs usage are convincing, this study suggests more research is needed for better understanding of the design of the signs. Thus, the subjects discussed in the literature review is an area of much-needed research.

Previous user studies

To outline and proof the presence of a problem, there were three user studies.

Results of the first user study

The first survey was conducted via Facebook in August 2018. This survey was the first pilot study for the current research. There were three sections in the survey which included general information about participants related to their visual orientation, habits and recognition experience in Taiwan. There were in total of 23 participants who belonged to distinct nationalities but had a residency in Taiwan at that time. Participants" average age was from 25-35 years old, and the rest were aged 18-24 due to the majority of them being students in 2018. The gender balance was roughly equal. Almost 70% of participants held residences in Yunlin county. Only one-fourth of all

participants were native English speakers when the rest of them had other native languages. Around 65% of participants defined their Chinese language level as a "beginner", so most of them were not able to read the captions on signages while their visual orientation.

Since most of the participants were students, they often go out for local cafes and restaurants, which is a cheap and easiest way to get food in Taiwan. The survey shows that 44% of participants ate street food more than seven times a week, and another 17% typically do it 5-6 times a week while they live in Taiwan.

Most of the questions of the second part of the survey were related to their habits and attitude to Taiwanese signage design. Overall, this part demonstrated that problems existed and the participants met some difficulties in their life without knowing Chinese in Taiwan.

The third part asked them about the effectiveness of pictograms and asked them to define services which were the most complicated to find on the street through visual orientation. There was a set of multiple-choice questions which allowed participants to select the most complicated to find on the street services out of twenty-one. These services were defined based on the author's personal experience. This list included: "chemistry", "doctor", "bookstore", "convenience store", "barbershop", "clothing boutique", "cafe/restaurant", "department store", "scooter shop", "hardware store", "massage", "cosmetic shops", "coffee shop", "children's shop", "hot-pot", "sushi shop", "ramen cafe", "night market", "cinema", "market". According to the results, the "chemist", "doctor" and "hardware shop" were the most complicated visually defined on the street. (see Fig. 1)

To conclude, it can be said that the survey demonstrated the need for a universal sign system and defence services which need them the most. Taking into consideration the fact that many foreign residents and tourists are not native English speakers, translation to English might not be a solution. “As English is the first foreign language in Taiwan, people do not have a high level of English in verbal communication, in particular, in the middle and central parts of Taiwan where internalization is not so high.” (Ominina, M., & Shen, S.T., 2019)

Figure 1. The results of the multiple-choice question.

Results of the second user study

The second survey was conducted among 231 participants in January 2019. The participants were divided into three groups: International (56), Russian (42), Taiwanese (133). There were 16 pre-selected signs also divided into three groups: Globalized signs, Localized signs, Standardized signs. (see Fig. 2) The belonging of the signs to specific groups was chosen by the author based on the origin of the signs. All of the signs were chosen by the author through visual research and Google search. In the survey, all the signs were mixed and asked as multiple-choice questions with one correct and two wrong answers.

Figure 2. The signs tested in the second study.

These signs were tested to examine blind gaps in the types of services selected during the first user survey. (see Fig. 1) The results were quite promising and the accuracy of the interpretation and visual recognition of signs by people from distinct cultures.

The localized sign group had quite low results among International and Russian participants due to the signs being Taiwanese and Japanese. Nevertheless, Japanese signs (which were more detailed and pictorial than Taiwanese signs) had lower results among Taiwanese rather than for Russian and international participants. The highest recognition rate by all participants group was achieved by the Japanese most detailed sign with the high level of semantic distance among all localized signs. The Russian group of participants demonstrated the worst results out of all three groups, the rest of the localized signs were complicated for the participants and more than 33%. The International group of participants achieved lower than 60% among all signs in the localised group except the one which was mentioned before. The Taiwanese group of participants had the highest result besides one Taiwanese sign which was the most challenging for all participants. Even geographical and cultural closeness did not help participants incorrect decoding of tested signs.

The globalized signs are supposed to work effectively for every nation and culture. Current surveys demonstrate that it is not always true. Most of the signs were related to the healthcare area in this group because in the previous survey these kinds of services were the most challenging to recognize. The Taiwanese group of participants had more difficulties than other participants to recognize signs correctly in this group. The Russian group of participants had better results than the Taiwanese group but lower results than the International group. Taiwan and Russia are high-context countries which means that for Russians and Taiwanese

context is significant. Most of the signs in this group were quite abstract and needed a context to be decoded correctly, it might be the reason for such results. The international group of participants had the highest results and recognized most of the signs.

The results among the standardised signs group presented a similar problem of low recognition for Taiwanese participants as the globalized signs. The Taiwanese group demonstrated worthy results among other groups of participants. The reason for this might be that most of the signs presented in this group are visually based on European culture and meanings. The Russian group of participants performed well for almost all signs in this group except one which surprisingly had the highest result among Taiwanese participants. The International group of participants had high results as Russian apart from one sign which was mentioned in the previous above.

Overall results demonstrated that localized signs work not efficiently for people who do not belong to the culture of sign origin. Moreover, for Taiwanese participants globalized and standardized sign decoding seemed to be more complicated rather than localized signs. According to results, detalization and direct depiction of the sign might help to improve recognition. A sign which usually belongs to globalized and standardized signs have roots in ancient or modern European culture, which may make recognition more efficient among Westerners rather than Asian nationalities.

Results of the third user study

This survey was conducted to cover blind gaps of services which were chosen during the second user study. The study was conducted in January 2020 with Google forms. There were 76 participants, some of them took part in the previous surveys, the rest of them were newcomers. Participants were divided into the three groups: Russian, Taiwanese and International. First two groups had an almost equal number of participants: 32 in Russian group and 30 in Taiwanese. The international group had only 14 participants.

There were 15 preselected signs. They were divided into three groups: localised, globalized, and standardised. There were five signs on the same topics in each group: Food, Spa/Massage, Cafe/Restaurants, Hardware shop, Transport. (see Fig. 3)

The results were quite high for all of the signs except a few. There were several crucial findings which help in the accuracy of the interpretation and creation of signs. Some questions to signs had alternative answers in the questions, which could also be applied to the sign. These alternative answers were chosen by the majority of the respondents in some cases. This was especially evident in specific groups of participants where their culture belonging affects their choices. The significant difference was between Taiwanese and other participants. Some well-known signs by International and Russians were interpreted in other ways by Taiwanese.

Besides, the sign with an English caption on it achieved high results among Taiwanese and International participants when Russian group had quite low results compared to other groups.

Figure 3. The signs tested in the third study.

As can be seen, the fourth user study demonstrated a similar result as the previous study that globalized and standardised signs had the highest perception rate for all groups of participants. The same sign might be interpreted in various ways by people from different cultures due to distinct factors such as colour, shape, extra elements and others. These small features in the signs may affect people of various cultures according to their cultural belongings and moulded perception. However, some of the signs were complicated to recognize for all participants.

Conclusion of all pilot studies

There were three user studies which helped to highlight the problem of users from various cultures orientation in Taiwan. This pre-research helped to understand which qualities and signs work more efficiently and had higher recognition rates.

The first user study demonstrated the outline of the problem in the orientation of foreign non-Chinese speaking residents in Taiwan. Besides, the participants confirmed the idea of the demand for a system of signs or pictograms in general, and also admitted the possibility of additional visual orientation in Taiwan.

The second online survey indicated that international users' perception of signs works better with globalized and standardized signs. It follows that Taiwanese participants had lower recognition rates with globalized and standardized signs. Despite this, localized signs were hardly recognized by international participants.

Sign development and evaluation

This study aims to create a "universal signage system design" for both local and foreign residents. Based on the results of previous research and literature review, a list of the main qualities of the future system was defined.

To avoid unnecessary complication, it was decided to adapt or redesign existing ideas, forms, and icons to the solid sign design system. Besides, the successful signs from user studies can be used as a base for sign design. The designer must consider whether the template of the sign exists in the user's cognitive system when designing a sign. (Wang, R. W., Wang, C.F., & Lin, C.H., 2011)

The design process of the first draft version

The design process implies a path from simple to more sophisticated. This paper presented only the first steps and user study to evaluate the first signs set acceptance. There were a few steps followed for the creation of the

system.

The first one was to create a list of signs. The basis of the list was the list of services in the first user study. The list includes: "chemistry", "doctor", "bookstore", "convenience store", "barbershop", "clothing boutique", "cafe/restaurant", "department store", "scooter shop", "hardware store", "massage", "cosmetic shops", "coffee shop", "kid's shop", "hot-pot", "sushi shop", "ramen cafe", "night market", "cinema", "market". (see Fig. 2) In addition to the services from the first user study, a "Blood donation" sign was created. The signs were divided into 4 groups: "Healthcare system", "Food", "Shopping and Entertainment", and "Beauty services".

The second step was to create a universal grid for the design purpose. There are many types of grids which include columns, rows, and modules. For the design, it was decided to use a manuscript grid with rounded borders and supportive horizontal and vertical lines. (see Fig. 4)

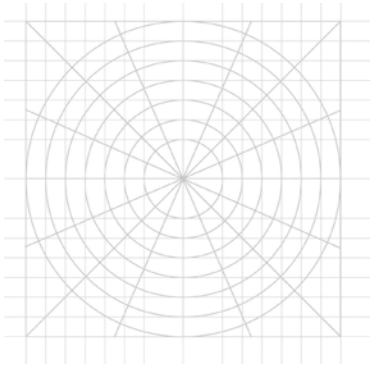

Figure 4. The grid for sign design.

Adobe Illustrator was used to designing the grid. Vector graphics are easy to resize without losing quality. The biggest circle of the grid was 160 mm and the smallest was 40 mm; besides, the size step between each circle was 20 mm.

The grid helps provide strong structure and flexibility to focus on the application of visuals and shapes that form the sign.

There were used circles, squares, rectangles, orthogonal, and diagonals for the design of signage. The first implementation of sign drafts was in low-fidelity.

Healthcare signs

There were five healthcare signs designed for three different kinds of services. There was "Doctor", "Pharmacy", "Blood donation". (see Fig. 5)

The "Doctor" sign was presenting a human with a cross on the chest since the red cross symbol had achieved high results in the user studies.

The "Pharmacy" was presented in two versions due to there being no certainty that a standardised version would work efficiently. According to the previous studies, European rooted signs did not work good enough for Taiwanese participants. The first version presents the simplified version of 'Caduceus and bowl of Hygeia' where the snake was depicted as a curved line. In an attempt to improve chances of correct recognition a cross was added to the bowl. The second version depicts objects

related to the pharmacy: a small jar with a cross on it and a plate with pills. This version is an effort to evaluate the same meaning which one might be more universal.

The "Blood donation" sign depicts a hand and a falling big drop with a cross on it.

Figure 5. The design of the healthcare signs.

Food

There were 10 signs related to the Food section. This section included: "Convenience store", "Tea shop", "Coffee shop", "Hot pot", "Ramen", "Market", "Night market", "Massage", "Sushi", "Cafe". (Figure 6)

Convenience store phenomenon is widely spread in Taiwan. This kind of shop can be found in almost every city, town or village in Taiwan. Convenience stores appear under the Chinese and Japanese impacts, there are new types of convenience stores such as 7-11, Family Mart, Simple Mart and old (traditional) kinds of stores. The "Convenience store" sign depicts a bottle and a sandwich shape figure. The design idea was to demonstrate things which are common for most of the stores. Probably the biggest differences between western convenience stores and Taiwanese is that Taiwanese spend spare time and have meetings in convenience stores while westerners mostly use theirs just as they shop.

Taiwanese tea is a brand. There are plenty of tea plantations, tea post-processing and selling points in Taiwan. It is one of the significant local traditions. Both locals and tourists buy tea which means they use this type of shop. In order not to get lost in search of tea shops, an understandable sign is needed, since traditional tea houses, as a rule, do not have signs in English or with any additional visual cues. The sign depicts a circle which repeats the image of the teapot with stylized tea leaves on the body of the teapot. The image of tea leaves works as an addition to support the sign's meaning. The tea shop sign with a cup and leaves was tested in the third study with the correct answer "cafe" and most of the participants recognised it as 'Tea house'.

Just like tea, coffee is grown in Taiwan. Almost everywhere in Taiwan customers can order coffee. Coffee shops presented in every city and town in Taiwan. Local people, as well as foreigners, like to spend their time working, studying or meeting friends in coffee shops. The sign depicts a cup ("to go") which is a recognizable silhouette of the coffee, which is used almost in all coffee shops worldwide. There are three coffee beans which are the decor of the cup and indicate what kind of drink this cup represents.

Hot-pot is another tradition that came to Taiwan from Mainland China and Japan. It is a common type of restaurant in Taiwan. This is a kind of hot soup dish which customers cook by themselves on the table with the hot pot on it. That is why the sign depicts a pot with lines which represent steam from the pot.

Ramen is a Japanese kind of food and it is highly popular in Taiwan. Ramen is a hand-made noodle of various sizes. There are many kinds of ramen but quite common there are special restaurants which are the main kind, of course, is ramen. The sign depicts a bowl with

rounded lines representing noodles above the bowl. Also, there are two perpendicular lines which depict chopsticks.

Markets exist in all cultures, it is a place where farmers sell fresh food and customers buy things they need. Taiwanese day market is the same. Usually, local markets offer fruits, vegetables, meat and fish. The sign depicts a basket with some vegetables and fruits inside it.

Figure 6. The design of the food signs.

The night market is a specific of the Asian region. In the first user study, the participants defined that "Night market" was an easily recognizable service without knowing Chinese in Taiwan. It is a place where various types of street food can be found. Often, people buy what they see and consume it at the place they bought it. That is why most of the places provide wooden sticks to customers. The sign depicts two sticks with round shapes on them which imitate food.

Even Taiwanese use chopsticks, according to the third survey, a similar sign achieved quite a high recognition rate. Since there exist visual and recognizable symbols for restaurants, changing the conception was not necessary. The "Restaurant" sign presents an ordinary round plate with a fork and knife on it.

Sushi is a Japanese kind of food which became extremely popular worldwide and Taiwan is not an exception. Usually, sushi has a few kinds of shapes but for this sign, the roll type

was used. The sign depicts two crossed chopsticks with a roll between them.

The last one in this group is the “Cafe” sign. It depicts a mug with three lines above the mug representing steam from the hot drink. There were tested in the third study a sign similar to this one which had high results incorrect answers, so there was no point to change the design conception.

Shopping and entertainment

There were nine signs in the Shopping and Entertainment section with seven kinds of services: “Bookstore”, “Scooter shop”, “Hardware store”, “Kid’s shop”, “Cinema”, “Department store”, “Clothing boutique”. (Figure 7)

According to the first user study, the bookstore was one of the easy to recognize kinds of service to find for non-Chinese speakers in Taiwan. The sign “Bookstore” has two outlined side viewbooks, one on the top of the other, besides, there was a bookmark on the bottom one.

People in Taiwan use scooters as a popular economical type of transportation. For this reason, there was a need for a sign indicating services where customers can buy, fix or rent a scooter. The sign depicts a few shapes which together appear to be a scooter.

Hardware store service was one of the challenging ones for non-Chinese speaking users to find on the street in Taiwan, but in the last survey similar kinds of signs were tested and had ambiguous results. For the sign “Hardware store”, the unity of two tools were used: a key and a screwdriver.

The kid`s shop service was not tested as a sign in the previous studies; nevertheless, it was easy to recognise by users in the first study. The sign “Kid’s ship” depicts a silhouette of a toy bear which is an attribute of the majority of kid’s shops.

Cinemas are one of the most common entertainments in developed countries. Under the globalization impact, it has appeared almost everywhere. Cinema, the same as a kid's shop, met not many difficulties in visual recognition by participants in the first user study. The sign “Cinema” has a camera on the sign placed in the centre and turned the right side. Lens, reels and film lean maintain a compositional balance.

Shopping plays a significant role in the 21st century. Department stores are necessary attributes of every city and big towns. They are constantly visited by many people. It must be designed as a special sign for them. There were no department store signs tested during other studies, there are two versions of this sign presented to have options in evaluation. The first one depicts a bow with a ribbon on it. The box turned to a specific angle to the viewers and its divided into rectangles by the ribbon line that covers it from all visible sides. The second version has a shopping bag with handles on it.

The clothing boutique presented in two versions as the “Department store” sign. First one depicts a woman's purse. Clothing boutique service referring to shopping and clothes, but a purse is an accessory. The second sign presents a hanger outline due to hangers being attributes of clothes shops.

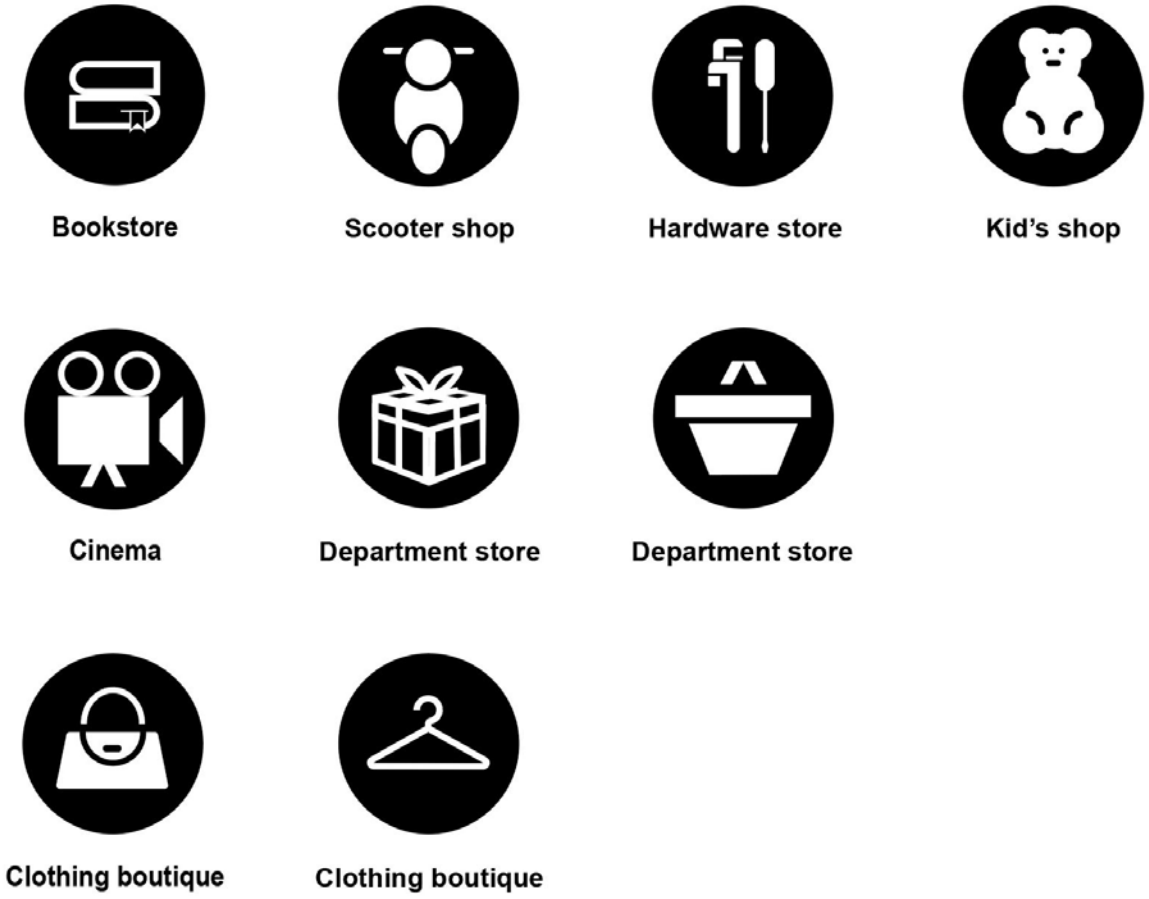

Figure 7. The design of the shopping and entertainment signs.

Beauty services

There were three signs related to beauty services. (see Fig. 8)

These days' cosmetic procedures have become popular mostly among women but some men also use this kind of service. Moreover, this kind of service usually includes not only beauty procedures but relaxing ones as well.

The sign depicts a female head, neck and shoulders. They are located symmetrically concerning the edges of the sign's circle. The lady's hair is covered with a towel and her face has a relaxed smile.

A barbershop is a service where men and women could get a haircut, styling and other services related to the beauty of hair. The sign depicts scissors to avoid wrong interpretation of the service. There was no relation to gender, besides, scissors are intuitively associated with the services of a barbershop.

Massage is widespread in Taiwan. There are many massage salons everywhere in Taiwan. Locals as well as foreigners use this service often. The most popular massage in Taiwan is foot massage that is why most salons put foot signages on the massage service places. Even so, they serve a full body massage as well. For the sign, it was decided to put a more standardized version of the massage sign. The sign depicts two humans which imitate a position of massage maker and receiver. One of the humans is vertical and the other one is horizontal.

Figure 8. The design of the beauty services signs.

Sign evaluation

There was a sign evaluation survey conducted in Google form via Facebook in May 2020. There were 15 international participants and nine Taiwanese. Amongst the international participants, there were people from the USA, UK, Mongolia, Thailand, Russia, France, New Zealand. They were different ages, and gender balance was almost equal. Almost half of the participants were employed and 35% were students, the rest of the participants had distinct statuses.

This survey used a Likert scale type of questions with a scale which typically includes five points: "Strongly disagree", "Disagree", "Neither agree nor disagree", "Agree", "Strongly agree". In the survey, it was put forward as a scale from '1' to '5' where '1' was 'Strongly disagree' and '5' was 'Strongly agree'. Besides, there was a space to leave a comment after each question. (see Appendix 1)

The acceptance rate was divided into "Accepted", "Moderately accepted", and "Rejected" signs. The "Accepted" signs must achieve 67% or more in the evaluation. For "Accepted" signs, there was no need for redesign. The "Moderately accepted" have less than 67% and more than 40% in the user study. These signs were modified not significantly. The "Rejected" sign achieved less than 40% in the study and must be redesigned from scratch.

Results of the evaluation

There were 12 "Accepted" signs: 'Restaurant' (96%), 'Cinema' (92%), 'Cafe' (93%), 'Coffee shop' (89%), 'Teashop'(85%), 'Hotpot' (85%), 'Ramen shop' (81%), 'Barbershop' (77%), 'Doctor' (77%).

There were 13 "Moderately accepted" signs. They include: 'Children shop' (66%), 'Hardware store' (65%), 'Clothing boutique' (62%), 'Market' (57%), 'Sushi' (54%), 'Scooter shop' (54%), 'Department store' (54%) 'Pharmacy' (51%), 'Pharmacy' (50%), 'Clothes boutique' (50%), 'Cosmetology' (47%), 'Massage' (47%) 'Blood donation' (42%).

There were four "Rejected" signs in total: 'Bookstore' (35%), 'Night market' (24%), 'Department store', (16%) 'Convenient store'(15%) had the worst results. The 'Department store' sign had two variations, and one of them failed and another one got into the "Moderately accepted" sign group.

Redesign of signs according to the results of the survey

Moderate accepted signs

There were 13 “Moderately accepted” signs which achieved less than 67% but more than 40% acceptance rate. They were changed based on the comments from the evaluation and some of the conclusions which were outlined during previous research. (see Fig. 8)

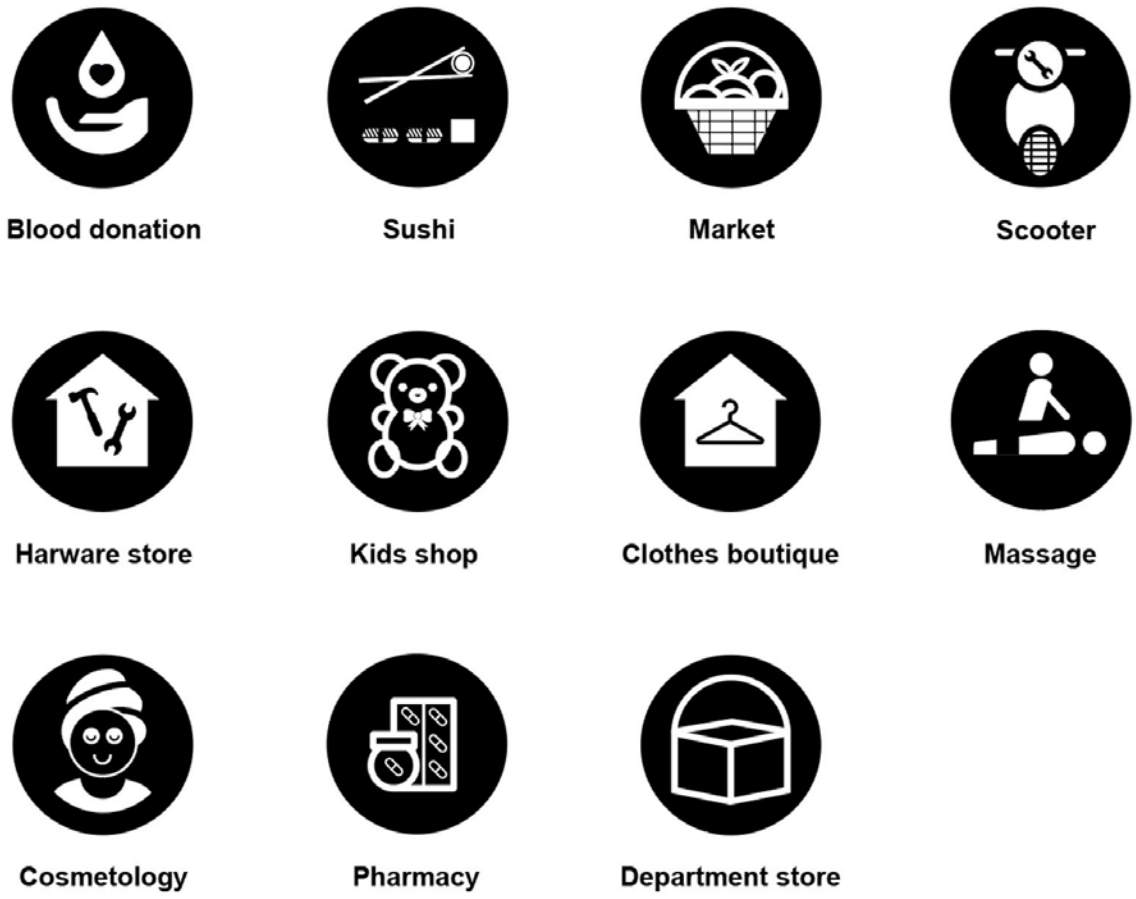

Figure 8. The redesign of the moderate accepted signs.

The survey comments lead to the idea to put a cross with a heart shape inside a drop silhouette in the ‘Blood donation’ sign. The heart shape is related to blood and care.

There were three extra pictures of sushi added on the bottom of the ‘Sushi’ sign and chopsticks holding the sushi were modified to become more realistic ones.

Following the suggestion from the participants, to look more like a real basket, the basket in the ‘Market’ sign was modified to become more detailed.

There was added a spanner on the scooter and lines demonstrating a wheel of the scooter for the ‘Scooter shop’ sign.

The ‘Hardware store’ sign had a significant redesign. The screwdriver was replaced with a spanner, and the wrench was replaced with a hammer. Both tools were put in the shape of the house in the background.

The ‘Kids’ shop’ was slightly changed to make it more childlike. The bear became outlined and a bow was added to its chest.

There were two ‘Clothes boutique’ signs designed in the first draft proposal. The version with the hanger achieved a higher acceptance rate in the evaluation; besides, both of the signs

were “Moderately accepted” signs. The new version of the sign depicts a hanger with a white house in the background.

Overall, most of the signs in this group were slightly redesigned with the addition of extra details based on comments and previous studies.

Rejected signs

The “Rejected” sign group was redesigned according to comments and additional research. There were four rejected signs in total; however, there were three presented and changed due to the ‘Department store’ sign’s second version being in the “Moderate accepted” group.

The “Convenience store” sign was redesigned to a building shape with a door and a caption “24” on the top of it which means 24 hours open. Convenience stores are a local phenomenon highly widespread and a majority of them are always open 24/7 in Taiwan. It is hard to find a town or city without a convenience store around. (see Fig. 9)

The “Bookstore” sign was redesigned to the more standardized and common version of it. However, it still can be recognized as a library. It depicts an open book shape with lines which imitates text lines inside the book.

The “Night market” sign was probably the hardest to redesign universally since it is a local phenomenon and includes various food and other services inside it. Most common food at night markets served with wooden sticks for eating. The additional research through the internet and existing design related to night markets helped to create an idea to depict a Taiwan country shape including all islands and a round-shaped food on sticks.

Figure 9. The redesign of the rejected signs.

Implementation proposal

There were various possible implementations of the sign presented. These mockups show how the signs would look in a realistic environment. These signs were created to help local businesses attract new customers and people from various cultures who live or travel in Taiwan easily find places they need. (see Fig. 10)

Colour palettes were chosen not systematically, so it should not be taken into consideration. The mockups were created just to demonstrate signs itself.

The correct transmission of information in the full visual noise environment is crucial. All of the signs should be used with text captions in future. It should improve the recognition rate as well as make signs more clear for all users. Captions should be presented in both English and Mandarin in future. According to de Paolis

& Guerini who suggested the best usage of letters and pictograms of 30 mm and 50 mm size respectively, for a distance of 1 meter. When 150 mm and 250 mm for a distance of 5 metres. The preferable fonts are sans serif: Futura, Century Gothic, Arial, Frutiger, Gill Sans, Helvetica, Univers, at least 18 points with a 1.5-line spacing. (de Paolis & Guerini 2015)

The first picture has a “Hotpot” sign on the glass door of the restaurant next to other signs such as Foodpanda, no smoking. Next, this mockup presented a realistic signage mockup with “Pharmacy” sign on it.

The third mockup presents the signage with “Barbershop” signs on it. It is supposed to be big and noticeable in real life, so people can define barbershop service fast and precise.

The “Teashop” sign presents as big signage on clear mockup the same as the “Pharmacy” sign.

The “Restaurant” sign is presented on the signage in the real street environment. In this try, the sign was designed with a bright colour to make it more noticeable.

The last one is “Market” sign which is depicted on the signage which looks like a logo of this place what would be a great achievement if local businesses will use the signs as a logos; thus the signs would become more widespread and recognizable.

To summarize the implementation proposal, it could be highlighted that the possible implementations can be various. These options should be tested and evaluated what makes signs using the most efficient and effective for users in the first place.

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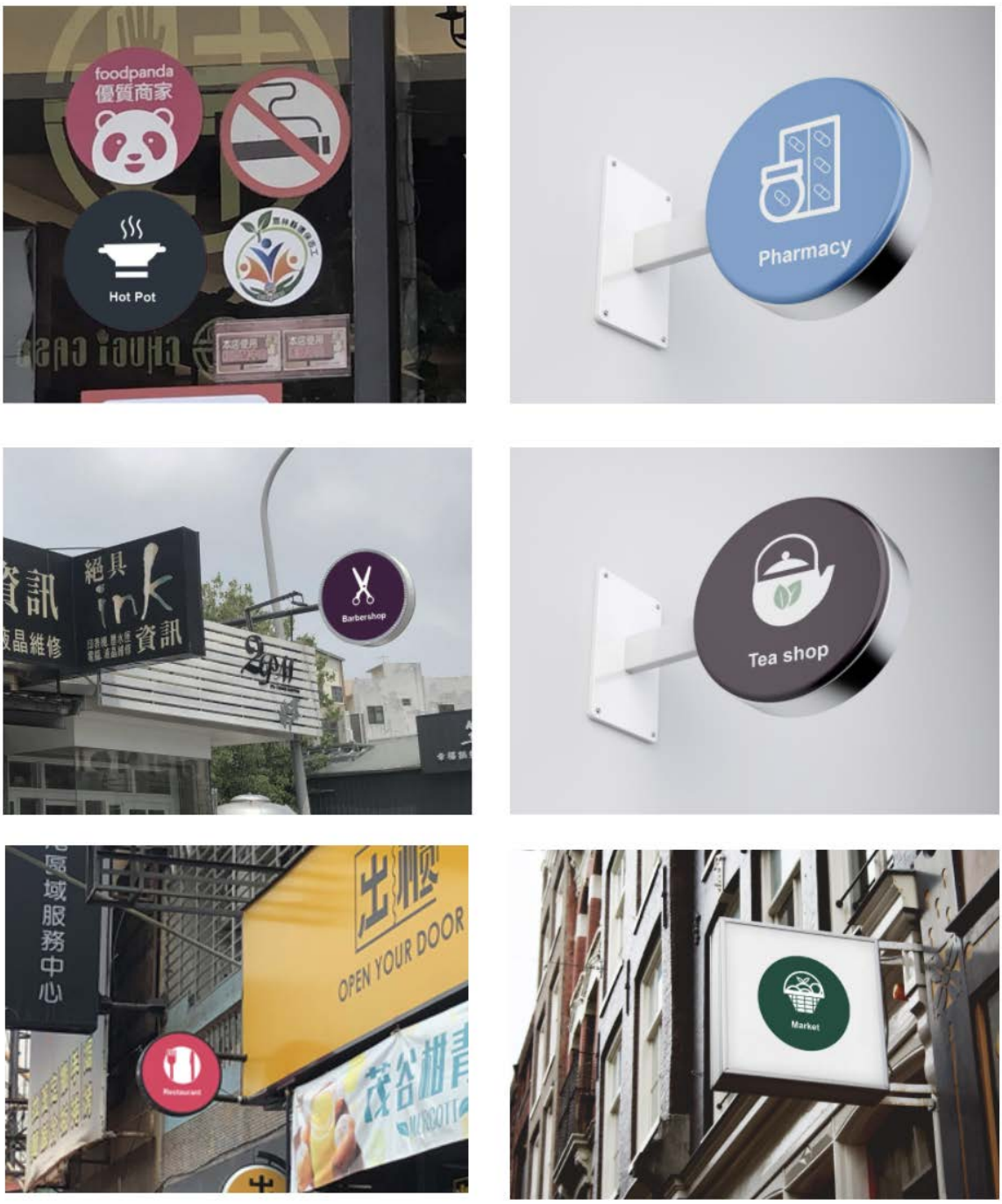

Figure 10. The mockups of the implementation proposal.

Conclusions and further implications

This study is a basis and stepping point for further research into semiotics, culture and the user acceptance rate of the proposal of the new sign design system in Yunlin county, Taiwan.

The importance of the work is accelerating from the fact that Yunlin county and Taiwan are attracting more foreign visitors to travel and settle down. According to the Yunlin government, an official web page in 2007 the area of Yunlin industrial park covers one-third of the total industrial area in Taiwan. Government invests a lot of money to attract foreign professionals to Yunlin. Of course, many

professionals and businessmen come here to work in Taipei or other big cities, nevertheless, a growing part of these people go to live and work in Yunlin county. These accelerations of globalization demonstrate the need for clear visual communication for all residents in Yunlin county. Besides, it may be beneficial for local businesses as well as usual people to increase sales and make their region more multicultural.

According to the results of the previous user study, an existing visual design does not work for foreign residents the same efficiently as for residents. The experience of previous researchers outlined the problem and demonstrated the importance of universality of the signs. To emphasize, it was highlighted that globalized and standardised signs work more efficiently than localised for the majority of the participants. The best solution was defined as a creation of the universal signs which were based on the principles of globalized and standardized signs. Besides, it was found that textual captions in English might be helpful to achieve high recognition and acceptance rates.

As a result of the research, there were 26 drafts of signs created for 21 kinds of services. Some of the services had two versions of the signs due to ambiguous services. These signs were designed based on the previous research as well as visual research on the internet. All of the designed signs were evaluated via Google form survey to estimate acceptance and perception rates. The results of the evaluation divided signs into three groups: accepted (the signs which achieved more than 67%), moderate accepted (the signs which achieved less than 67% but more than 40%) and rejected (the signs which achieved less than 40%). After the evaluation, there was a gap for improvement. The accepted signs did not need any modifications. The moderate accepted signs had a slight redesign. The rejected signs were redesigned from scratch. The final design of 21 signs was presented and possible implementations were suggested.

The overall results of this paper demonstrated solid and promising results in acceptance and communication of the sign system. The investigation of visual recognition and decoding of information by people from distinct cultures also gave a better understanding of principals for developing signs for localized regions. Future research should include a deeper investigation of local services and business in Yunlin county. It is essential to find other services which must be included in the sign system.

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Appendix A. The user evaluation questionnaire

Introduction

Thanks for participating! This questionnaire does not test you; it checks the suitability of Taiwanese advertising and design for the needs of foreigners. Please try to answer carefully and leave your email address in case I have any questions in the future. Thanks again!

General information questionnaire

What is your Age?
What is your gender?
How would you describe your current status?
Where are you from?

Visual recognition questionnaire

Q1. Does this sign look like a "Doctor" service?
Strongly disagree Disagree Neutral Agree Strongly agree
Q2. Does this sign look like a "Blood donation" service?
Strongly disagree Disagree Neutral Agree Strongly agree
Q3. Does this sign look like a "Pharmacy" service?
Strongly disagree Disagree Neutral Agree Strongly agree
Q4. Does this sign look like a "Convenient store" service?
Strongly disagree Disagree Neutral Agree Strongly agree
Q5. Does this sign look like a "Tea shop" service?
Strongly disagree Disagree Neutral Agree Strongly agree
Q6. Does this sign look like a "Pharmacy" service?
Strongly disagree Disagree Neutral Agree Strongly agree
Q7. Does this sign look like a "Hot pot" service?
Strongly disagree Disagree Neutral Agree Strongly agree
Q8. Does this sign look like a "Sushi shop" service?
Strongly disagree Disagree Neutral Agree Strongly agree
Q9. Does this sign look like a "Restaurant" service?
Strongly disagree Disagree Neutral Agree Strongly agree
Q10. Does this sign look like a "Market" service?
Strongly disagree Disagree Neutral Agree Strongly agree
Q11. Does this sign look like a "Night Market" service?
Strongly disagree Disagree Neutral Agree Strongly agree
Q12. Does this sign look like a "Ramen shop" service?
Strongly disagree Disagree Neutral Agree Strongly agree

Q13. Does this sign look like a "Cafe" service?

Strongly disagree Disagree Neutral Agree Strongly agree

Q14. Does this sign look like a "Coffeeshop" service?

Strongly disagree Disagree Neutral Agree Strongly agree

Q15. Does this sign look like a "Cosmetology" service?

Strongly disagree Disagree Neutral Agree Strongly agree

Q16. Does this sign look like a "Barbershop" service?

Strongly disagree Disagree Neutral Agree Strongly agree

Q17. Does this sign look like a "Massage" service?

Strongly disagree Disagree Neutral Agree Strongly agree

Q18. Does this sign look like a "Bookstore" service?

Strongly disagree Disagree Neutral Agree Strongly agree

Q19. Does this sign look like a "Scooter shop" service?

Strongly disagree Disagree Neutral Agree Strongly agree

Q20. Does this sign look like a "Hardware store" service?

Strongly disagree Disagree Neutral Agree Strongly agree

Q21. Does this sign look like a "Kids shop" service?

Strongly disagree Disagree Neutral Agree Strongly agree

Q22. Does this sign look like a "Cinema" service?

Strongly disagree Disagree Neutral Agree Strongly agree

Q23. Does this sign look like a "Department store" service?

Strongly disagree Disagree Neutral Agree Strongly agree

Q24. Does this sign look like a "Clothes boutique" service?

Strongly disagree Disagree Neutral Agree Strongly agree

Q25. Does this sign look like a "Department store" service?

Strongly disagree Disagree Neutral Agree Strongly agree

Q26. Does this sign look like a "Clothes boutique" service?

Strongly disagree Disagree Neutral Agree Strongly agree

Q27. You can leave me feedback about your experience and thoughts about the signs.

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AND MAKE THEM HAPPEN

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